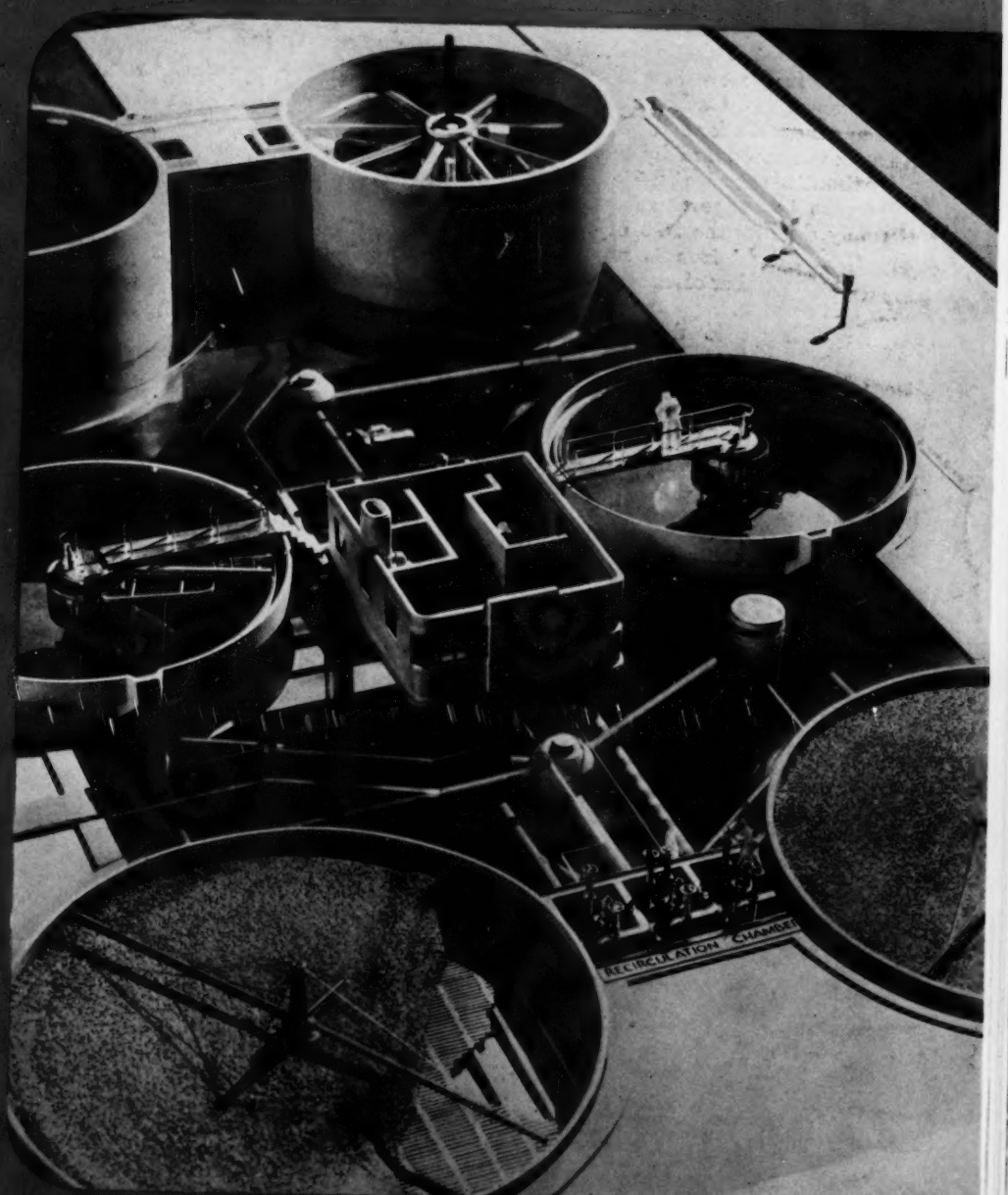
ENGINEERING NEWS-RECORD

JULY 15, 1943



Scale model of an every sewage treatment plant, which is used to speed the training of operators. (See story inside)

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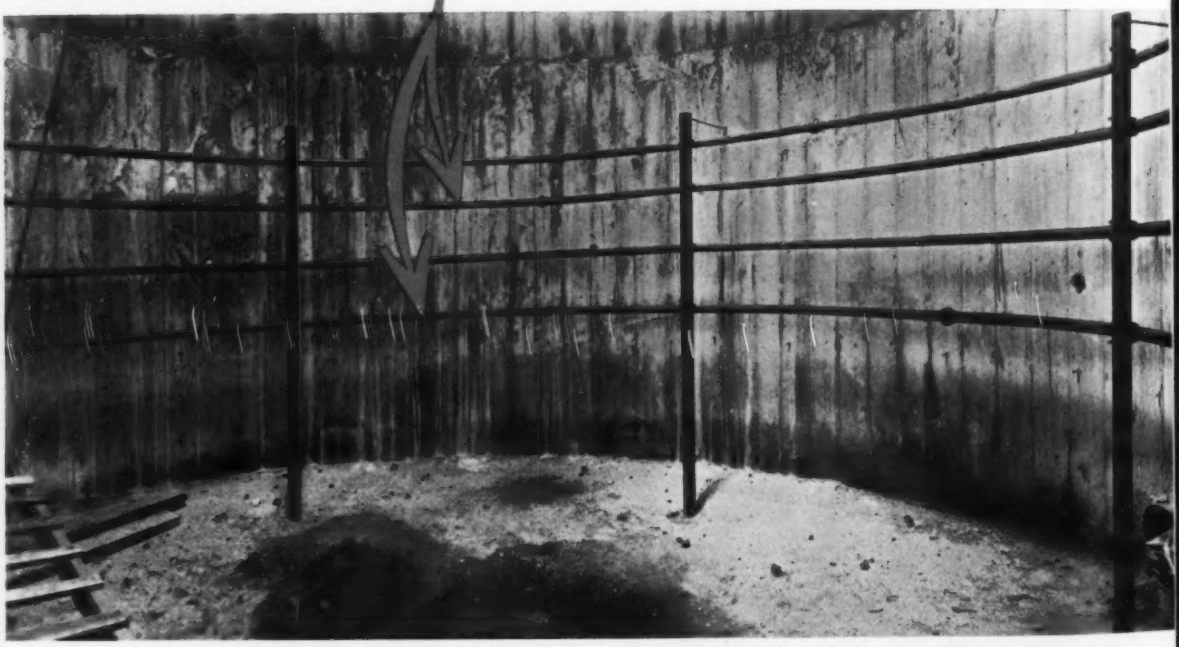

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McGRAW-HILL PUBLISHING COMPANY, INC.

Publication Office: 99-129 North Broadway, Albany, N. Y. • Editorial and Executive Offices: 330 West 42nd Street, New York

JOHN ABBINK, *Publisher*

WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Manager*

Vol. 131 JULY 15, 1943 No. 3

COMING NEXT

• BUILDING THE INTER-AMERICAN HIGHWAY—Beginning the first of several articles to appear in *ENR* giving first-hand information on construction progress of this vital link in the Pan American highway system, which is now being forged through the jungles and mountains of Central America. A. N. Carter, of the *News-Record* staff, was dispatched to the scenes of action and his articles are based on actual field studies of surveying, location and construction methods, and the problems encountered in providing housing and sanitation facilities for the thousands of workers along the route. This first article will deal with the history of the project, survey problems and difficulties involved in getting equipment on the job and supplying housing accommodations for those on the work.

• An interesting example of heavy timber construction designed to save steel will be described in *ENR* for July 29. In this aircraft plant, 40-ft. span timber trusses carry end-reactions of 100-ft. span, three-hinged roof arches. Concrete columns of unusual design support the trusses and alternate arches. In some cases timber girders of plywood webs and laminated chord sections carry the floor and roof.

LOOKING AHEAD

• A number of sewage digester and clarifier tanks, varying in diameter from 50 to 70 ft. and in height from 8 to 14 ft., have been built recently at eastern army camps. They are constructed with multiple-arch brick walls, which eliminates the need for reinforcing steel, and no formwork is required as would be the case with conventional concrete tanks. Design and construction features will be described in an early issue.

• Since 1941, engineers of the Kansas highway department have been conducting a series of studies on designs of unreinforced concrete arch culverts. The result of these studies is now made available to *ENR* readers. Test on completed structures show that sound engineering practice must be applied for proper design of plain arches—merely thickening the shell and eliminating the reinforcing is not enough. Design data, concrete curing, and methods of backfill will be outlined in a forthcoming issue.

PAGE

The Week's Events 51
Comment and Discussion 58
Editorials 60
Taxicabs in the Yukon? JOHN ABBINK 62
Douglas Dam Constructed in 13 Months 64
Rigid Frames and Trussed Columns C. G. JENNINGS M. N. SALGO 69
Deep Footings Built Without Forms H. A. SAURBREY 72
Job-made Tackle Lifts Heavy Trusses JOHN D. WATSON 74
Sewage Plant Operation Taught with a Model 76
Barge Places 90-Ton Breakwater Blocks C. H. CRUTTWELL 79
Ship Construction Basins of Thin Concrete 82
Metal Manhole Covers Replaced With Timber or Concrete 86
Wood Stave Tank On a Timber Tower 87
CCC Buildings Salvaged for Army Camps 92
From Field and Office 95
Unit Prices 98
New Aids to the Constructor 100
Manufacturers' Activities 108
New Trade Publications 122
Men and Jobs 140
News of the Week 142
Meetings 156
Construction Reports 165

Number of copies of this issue printed: 35,989

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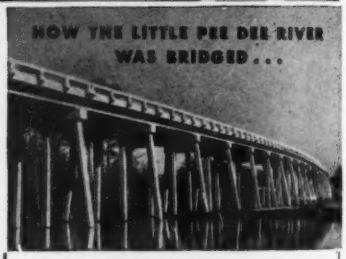

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For construction of the Potato Bed Ferry Bridge over the Little Pee Dee River, Atlas High-Early cement was specified for piling. Why? South Carolina Highway Specifications state, "No pile shall be driven until it is at least 24 days old and in cold weather for a longer period as determined by the engineer. This period may be reduced to 10 days if high-early strength is used"—a saving of 14 days!

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ENR-H-53

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The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • JULY 15, 1943 • VOLUME 131 • NUMBER 3

Controlled Materials Plan now covers all construction

New WPB Regulation 6 tells constructors how to get steel shapes, piling, copper wire, aluminum, rivets, and machinery and equipment under latest regulations.

Just issued by the War Production Board, is CMP Reg. 6, which outlines instructions for obtaining materials for construction, and for facilities acquired in connection with construction, under the Controlled Materials Plan. Only by abiding by the terms of this regulation can a contractor get such things as steel structural shapes and piling, copper wire, aluminum, rivets or "facilities." By "facilities" is meant any machinery or equipment acquired for installation in a construction project.

Controlled materials are carbon and alloy steel, including wrought iron; copper, including copper base alloys; and aluminum, in each case only in the forms and shapes indicated in Schedule I of CMP Reg. 1, as given at the end of this article.

An allotment of controlled materials is not in itself authorization to begin construction. Both an allotment and authorization by WPB are necessary, except in cases specified by Limitation Order L-1. Allotments are made by the Requirements Committee of WPB to the various claimant agencies, of which there are at present 14.

Who makes application

These claimant agencies, in turn, distribute the allotments received from the Requirements Committee to persons making application. Persons eligible to make application are, for the most part, those who are owners of the structure or project for which allotment is asked, and not the general contractor. On Army or Navy contracts, however, the contractor makes the application. In the case of foreign projects, the person holding the export license for the materials required applies; and in the case of projects financed through the Defense Plant Corporation, the person applies who has been designated by the corporation. Persons applying for and receiving an allotment of controlled materials from a claimant agency are called "prime consumers."

The prime consumer's contractor and sub-contractor are known as "secondary consumers," and must receive their allotment of controlled materials from the former. So, following a pyramided system of distribution, allotments are made from the Requirements Committee to the Claimant Agency, thence to the prime consumer, by him to his secondary consumers, and by the latter to other possible secondary consumers.

By means of an alternative method available to the prime consumer, he can make simultaneous allotments to all his secondary consumers. Under this procedure, all the secondary consumers or contractors of whatever degree of remoteness file their applications for allotments direct with the prime consumer, instead of with the contractor or subcontractor of next less remote. This provision is intended to simplify the routine, where a prime consumer "finds it impracticable to determine the exact allotments to be made" to each of his immediate contractors. Obviously, under this arrangement, each secondary consumer makes application only for his own requirements, and does not include

(*Continued on next page*)

Ingalls Shipbuilding Corp. photo

Vera Anderson is first woman arc welding champion

Winner of the first national women's arc welding championship held recently was blue-eyed Vera Anderson of Ingalls Shipyard, Pascagoula, Miss. She defeated Mrs. Hermina Strimska of Kaiser's Oregon Shipbuilding Co., Portland, Ore.

In a roped-off ring at the Ingalls yard, the girls fought it out on flat, vertical and overhead welding tests while being seconded by veteran Ingalls welders. The photograph shows Miss Anderson (left) and Mrs. Strimska (right) starting the vertical test in Round 2. Miss Anderson's victory netted her $350 in war bonds, a massive silver loving cup, a week-end trip to Washington, D. C., and title of "Queen" of the welding world.

requirements of those remote from him.

Requirements for different construction jobs which are identified by the same major program number of a particular Claimant Agency may be combined in a single allotment to a consumer.

A person who has received an allotment may place an order with any controlled materials warehouse or distributor or with any controlled materials, producer, unless otherwise specifically directed.

A person must, of course, have an allotment to support any order which he places. And he cannot request delivery of a greater amount, nor delivery on an earlier date, than needed to complete construction on schedule. Also, he must keep within inventory limits prescribed under CMP Reg. 2, but is not expected to reduce orders below the minimum mill quantity specified in Schedule IV of CMP Reg. 1.

The only limitations on use of allotments are obvious ones: (1) a consumer cannot make an allotment before receiving his own; (2) he cannot make total allotments or give orders in excess of the allotment made to him; (3) he cannot make allotments for products not embraced in this order; and (4) he is not to use his allotment for any construction except that for which it was made or to replace in inventory materials used for such construction.

Maintenance and repair work

Where maintenance and repair are part of a construction job, for which authorization to begin construction must be obtained, controlled materials required for such maintenance and repair must be included in the prime consumer's application.

No application under Reg. 6 need be filed, however, in the case of maintenance or repair work or of minor capital additions where there is no construction of the kind that must be authorized under L-41. In such case, the necessary materials can be obtained under CMP Regs. 5 and 5a.

To speed action, allotments can be obtained by telegraphing the required information and confirming it on a written form.

Application forms to be used by prime consumers in applying for allotments are designated as CMP REG. 6. In most cases, these are the same as those required to obtain authorization to begin construction under Conservation Order L-41.

Secondary consumers use Form CMP-4A. The consumer to whom secondary consumers would apply, however, can waive use of the application form if he already has sufficient information to enable him to make application for allotment.

If less than one ton of carbon steel, including wrought iron, or 400 lbs. of alloy steel, 100 lbs. of copper and copper base alloys, or 20 lbs. of aluminum is required, a person can forego the formality of making an allotment and can simply put on his order the applicable allotment number followed by the symbol SO, but he cannot subdivide his requirements to come within this provision. A claimant agency or industry division, instead of making allotments, can, under the circumstances given above authorize a prime consumer to obtain controlled materials by using the SO symbol.

Manufacturers of special Class A products off the site also receive allotments for controlled materials under the regulation. A "Class A product" is defined as a product not on the Official CMP Class B product list. Controlled materials for the manufacture of Class B products, which are standard products, are not obtained under this regulation.

Allotments to prime consumers are identified by allotment numbers consisting of a Claimant Agency letter symbol and a digit or digits indicating the program. Allotments to secondary consumers must be identified by an abbreviated allotment number consisting of a major program identification. They must also show the quarter for which allotment is valid.

Where an allotment to a prime consumer for the third quarter of 1943 is designated N-1234-567, the allotment to a secondary consumer will be N-1-3Q43, meaning an allotment for major program number 1 of the Navy Department, valid for placing authorized controlled material orders calling for shipment of controlled materials during the third quarter of 1943.

Orders, also, must be identified by an endorsement, including an allotment number or symbol. A given form, manually signed, is prescribed.

Delivery orders must be in sufficient detail to permit entry on mill schedules, and must call for delivery in a specified month in the quarter for which the allotment is valid. If placed with a controlled materials producer, they must be placed a specified length of time in advance of delivery date.

Where an allotment is made to a prime consumer for construction, preference ratings will be assigned either by the War Production Board or Claimant Agency making the allotment, depending on the type of project, for obtaining materials other than controlled materials needed in the construction. Extension of these ratings can be made to secondary consumers.

A new issue of the Critical Construction Materials Guide has been prepared by the Conservation Division of the War Production Board.

Physicists needed

Reports of the National Roster upon the shortages of physicists indicate that several hundred more emergency-physicists will be needed. All persons who feel that they may be able to serve in the capacity of physicists, either in research or as teachers of beginning physics in the training programs of the armed forces, should at once communicate with Dr. Homer L. Dodge, Director of the Office of Scientific Personnel, National Research Council, 2101 Constitution Avenue, N. W., Washington 25, D. C.

• • •

Consulting fees for Army set at $25 per day

The per diem rate allowed consulting architects and engineers by the Army has been set by Congress at $25. This rate, half of what it was during the two previous years, was specified in a section tucked away in the Military Establishment Bill under the heading of "Printing and binding.

Though the $25 limit was written into the original House bill and went from there through all the usual stages before enactment, it did so quietly, without attracting notice. It first became generally known when, after enactment, division engineers throughout the country were instructed to notify consulting engineers working with them of the changed rate.

It is said that the Corps of Engineers does not favor the change because of the difficulty, if not the impossibility, of obtaining satisfactory consulting service at so low a figure. The rate, based on civil-service pay rates, had stood at $25 for years until, in 1942 and 1943 it was raised to $50 through efforts of the Corps of Engineers, in order to obtain qualified experts.

• • •

Consulting engineers dissolve partnership

By mutual consent, the 19-yr. old partnership of Theodore L. Condron and Chester L. Post, consulting engineers of Chicago, was dissolved July 1. The partnership was formed in 1924 and during the past several years active practice of the firm has been conducted by Mr. Condron while Mr. Post has been located in Washington, as chairman of the Advisory Committee on Engineering of the U. S. Public Buildings Administration, FWA.

ENGINEERING ABROAD

London Sees the Postwar City

This is the second report from Waldo G. Bowman, editor of *Engineering News-Record*, who left for England late in May to observe the engineering work of American forces in the European theater of operations and to study and report on postwar planning in England.

By Waldo G. Bowman

London, July 11 *(By Cable)*

Tomorrow is the day set for the London County Council to accept for consideration a comprehensive plan for rebuilding London after the war which was prepared by the council's architect, J. H. Forshaw, in collaboration with Britain's most prominent town planner, Prof. Patrick Abercrombie of University College, London. On the following day when the plan is put on exhibition, Londoners will get their first glimpse of their city of the future. They will get an eyeful, as revealed at a press conference last week.

The London that the planners have fashioned in maps and architectural renderings is a model of city planning technique. Business and residential facilities are separated, industry is decentralized, wide circumferential parkways and radial streets distribute and sort road traffic, and a regrouping of railroad terminals does away with the present sprawling layouts. Tunnels replace the present railroad bridges over the Thames and new highway bridges are planned at Charing Cross and the Temple.

There are green belts, playgrounds, and a plan for rebuilding the present industrialized south bank of the Thames between London and Westminster bridges into a great cultural and recreational center. It is a bold and beautiful concept and one into which has gone much research and careful planning.

No final solution offered

The authors are both modest and practical in their claims for the plan. In the first place, they do not offer it as the final solution in all of its details, pointing out that in the 50 years during which it would conceivably be under construction, many changes in industrial and living conditions will occur which will demand facilities that cannot now be foreseen. But they do claim that it is a plan that is balanced among the various requirements of transport, living, working and playing, and that the objectives it seeks are sound. Moreover, they have been practical in dividing the plan into a number of work units the most pressing of which can be undertaken immediately after the war.

For example, they suggest immediate rebuilding of the bombed East End of London into neighborhood units of from 6,000 to 10,000 inhabitants, taking the large industrial establishments outside of the city and putting the smaller ones into factory flats or loft buildings. Next, rebuilding of the south bank should be undertaken, and in the meantime, a start should be made on modernizing the street and highway net. These are must jobs that will demand first priority anyway.

If the jobs are undertaken without thought to coordination with a master plan, prewar London will merely perpetuate itself, says Mr. Forshaw and Prof. Abercrombie. The significance of the present L.C.C. plan is that it provides the first master blueprint for a London of the future that has had any semblance of official sponsorship.

Acceptance of the plan by the London City Council, however, does not mean that it will be adopted, but only that it will be submitted to the metropolitan boroughs that comprise that L.C.C. for consideration. They may or may not vote its adoption.

In the meantime, the authors of the L.C.C. plan are working on a similar plan for the boroughs of Greater London outside the county, while the officials of the City of London, that one-square-mile independent community directly in the center of the county, are understood to have a plan of their own underway. London's postwar planning pot is thus bubbling briskly. Before many months have passed it should be apparent what sort of a feast is to be produced.

Highway planning bureau created in New Jersey

Announcement of the appointment of a highway planning bureau for greater efficiency in meeting road problems, especially in the postwar period, was made June 24 by Spencer Miller, Jr., state highway commissioner of New Jersey.

Sigvald Johannesson, designing engineer of the commission, will be the head of the new bureau. An advisory committee to the bureau will be composed of: Harold W. Giffin, survey and plans engineer; Morris Goodkind, bridge engineer; Alex W. Muir, superintendent of maintenance; Julius J. Newmark, special engineer; Edward E. Reed, acting assistant state highway engineer; Harry D. Robbins, southern district engineer; John A. Williams, division construction engineer, and Philip P. Thomas, manager of the state-wide planning survey.

Detailed specifications and layouts for construction will be continued under the control of C. F. Bedwell, acting state highway engineer, and the survey and plans division with H. W. Giffin as chief. Mr. Johannesson has been a member of the highway department staff since 1924. He was engineer of design for the Pulaski Skyway and approaches. The idea of moving concrete pavements sidewise by compressed air when converting a three-lane highway into a four-lane divided highway is one of his contributions.

After his graduation from the University of Copenhagen with the degree of civil engineer, Mr. Johannesson went to England to work on deep level tunnels and municipal improvement with the London County Council. He came to the United States in 1903 and was first engaged on the design of the Hudson River tunnels of the Pennsylvania R. R. Subsequently he participated in the reconstruction of the New York City elevated railroads.

• • •

Bashore acts as head of Reclamation work

Harry W. Bashore, assistant commissioner, U. S. Bureau of Reclamation, has been named acting commissioner in place of John W. Page who resigned on account of ill health (*ENR*, July 1, p. 6). Mr. Bashore has been relieving Mr. Page of most of his responsibilities for some time past.

Mr. Bashore is a graduate of LaGrange College in the class of 1906 and has been with the Bureau of Reclamation since the latter part of that year, chiefly on the construction of irrigation projects. He was brought to Washington as assistant commissioner in 1939 from his job as construction engineer on the Kendrick project in Wyoming.

Court action would stop employment of outside engineers by New York City

Civil Service Technical Guild bring action to keep the city from engaging outside engineers and architects for postwar projects.

The Civil Service Technical Guild has begun action in the Supreme Court of the State of New York to compel the city of New York to do all the engineering and architectural work in connection with the city's $700,000,000 postwar construction program with civil service employees. The action has been brought against the mayor and other city officials, as members of the Board of Estimate and the Civil Service Commission, by the guild, which is stated to represent 2,000 architectural and engineering civil service employees, and by Claude H. Rowles, an assistant civil engineer (structural) now out of work and on the city's preferred list of civil service employees.

In its petition the guild states that the mayor, in his message to the Board of Estimate asking approval of the postwar program, stated that part of the work was to be done by regular civil service employees in the engineering and achitectural agencies of the city and that part was to be done by private firms engaged for that purpose, but did not specify which work was to be done by the city. The petition states further that the mayor and the city planning commission are opposed to expanding the city's several engineering and architectural agencies in order to prepare the plans and estimates although there are over 500 civil service employees out of work and on the preferred list.

Last August, the Board of Estimate appropriated $10,500,000 for plans and specifications for the postwar projects. Since then contracts for $2,462,000 have been let to outside firms. Meanwhile, 204 architectural and engineering employees have been laid off.

Illegal action claimed

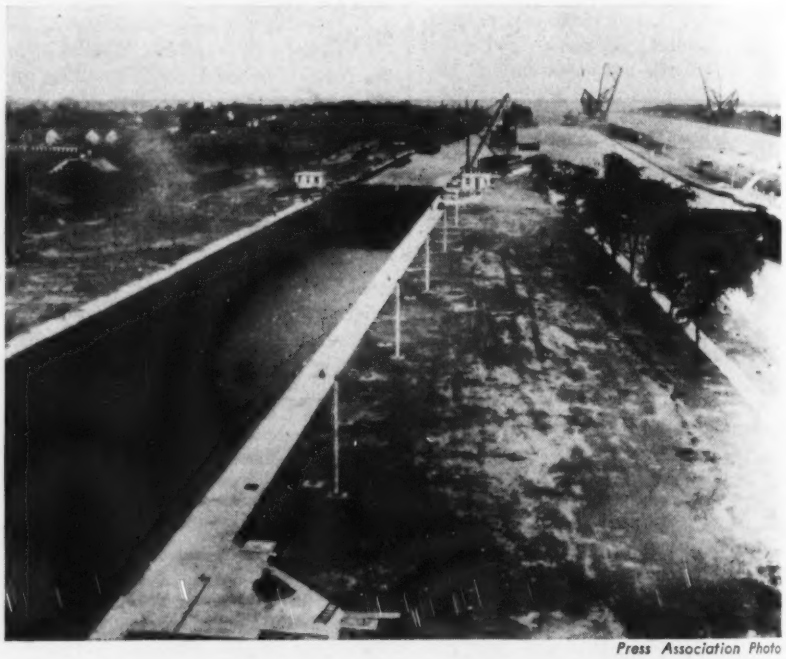
The guild, in its petition to the court, claims that the action of the Board of Estimate in approving contracts with outside firms and in paying these firms for their work is in violation of the civil service provisions of the state constitution. It is stated that the private architectural and engineering firms are "presently employing persons who were not appointed in accordance with the provisions of the civil service law, and who are assigned to or permitted to perform similar duties or services heretofore performed by such civil service employees."

The petitioners state that they are not attempting to prevent employment of architects or engineers of exceptional qualifications provided such services "are limited to those of an advisory nature dealing with the general scope of the project."

The court is asked to order the defendants to cancel all present contracts and to desist from entering into new ones, also to desist from making payments "directly or indirectly to any persons appointed to or employed as a private architectural or engineering firm." The guild asks that the defendants be ordered to permit only persons selected or appointed in accordance with the civil service law to "perform the designing and drafting of plans and specifications and estimates of cost for postwar projects."

Action having a somewhat similar objective was begun last May by the Municipal Engineers Society of the City of New York, representing about 600 men in city service. That body had introduced into the City Council a resolution calling upon the mayor to terminate the practice of letting architectural and engineering work to outside firms until such time as all engineers on the civil service preferred list had been reemployed. The resolution still is in committee.

Similarly, for the past several years, bills have been introduced into the New York State legislature to make it illegal for municipalities having engineering or architectural agencies to hire outside firms to do engineering or architectural work. These bills generally died in committee.



Press Association Photo

MacArthur Lock in service at the Soo

Completed in less than thirteen months as a war measure, the new lock at Sault Ste. Marie, Mich., shown at the left, was put into service on July 11. Named MacArthur Lock in honor of General Douglas MacArthur, the new lock occupies the site of the old Weitzel Lock built in 1881. There now are three locks on the American side of the St. Marys River capable of passing the largest ore boats moving from Lake Superior down to Lake Huron. The old Poe Lock, shown at the right is old and of smaller size. The Third and Fourth locks are on the canal spanned by the bascule bridge in the right background, the bridge that was disabled by an accident in October, 1941, tying up the movement of all large vessels on the American side, which accident hastened the decision to build a large lock on the old canal. A swing bridge carries the C.P.R. tracks over the latter canal. There is a large lock on the Canadian side.

MacArthur Lock is 800 ft. long, 80 ft. wide and 30 ft. deep over the sills. The Third and Fourth locks have similar width but are 1,000,-350 ft. long and have a depth of only 24.5 ft. over the sills. The new lock cost $14,000,-000. It was built by the Army Engineers under the direction of Col. Paschel N. Strong, district engineer. Contractors were the Great Lakes Dredge & Lock Co., Chicago. Miss Jan Harns, daughter of the project engineer Jack Harns, christened the lock.

Federal funds for flood control asked by Mississippi Valley Association

Representatives from many parts of the valley seek early appropriation for levee reconstruction and for storage reservoirs.

A flood-control conference, called by the Mississippi Valley Association at St. Louis on June 28, adopted resolutions calling for immediate appropriation of funds for emergency flood-control work, the adoption of a new flood-control bill as a war measure, and the establishment of a national flood program under control of one agency.

Pointing out that recent floods have dealt a serious blow to the war effort of the nation, several hundred delegates from Oregon to Pennsylvania approved resolutions outlining a five-point program as follows:

"Congress should immediately appropriate adequate funds to be made available to the United States Army Engineers, to provide for emergency flood-control work to repair, restore and strengthen levees and other flood-control works that have been threatened or destroyed by recent floods.

"Congress should, as soon as possible, provide funds for completion of the flood-control reservoirs and levee projects, authorized by the 1936, 1938 and 1941 flood-control acts, which would have substantially reduced the destructiveness of the 1943 floods.

"Since recent floods have indicated that certain projects are necessary to prevent repetition of such inundations and to provide protection for critical areas, the Flood-Control Committee should formulate, and Congress should adopt as soon as possible, a new flood-control bill to include such projects as war measures.

"Since flood control should be considered a national program, which should be under the control of one agency, and since the United States Army Engineers are pre-eminently qualified to be that one agency, Congress should give them complete authority over the construction, maintenance and operation of all flood-control reservoirs and works, including control of all multiple-purpose dams as approved by Congress.

"A long-range, unified program of conservation and economic use of water resources, including flood control and water-flow retardation, should be considered by organizations now in existence; that the formation of new local organizations for consideration of such a program by parties interested be encouraged, and that effort shall be made to coordinate all such activity and planning so that maximum results shall come from unified effort now and in the post-war period."

The Mississippi River Commission has reported to Congress: "It would be rash to say that the plans as now approved, or even as they may be modified in the near future, are a complete and final answer to the flood and navigation problems in the valley."

Aftermath of the flood

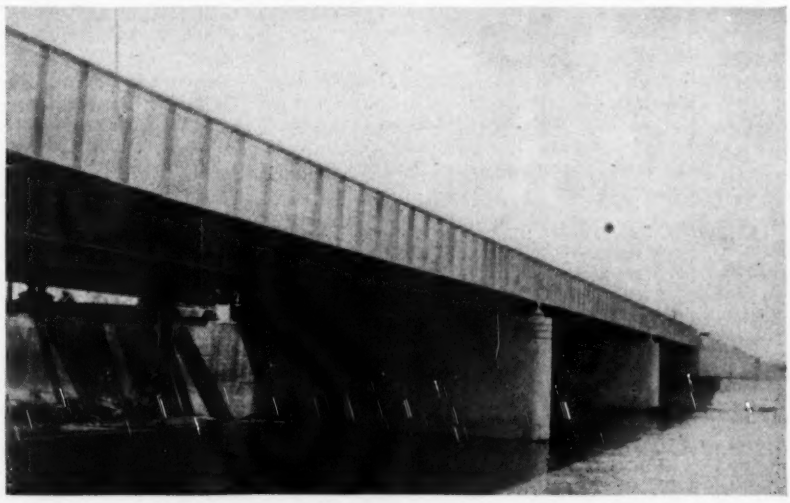
The first contingent of 3,775 troops requested for flood rehabilitation work in ten Arkansas Valley counties took up their stations on June 23. The men are engaged in removing debris and leveling drifts on land that was inundated. An estimate of 69,000 man-days labor and $622,697 has been made for the repair of flood damage in this district alone.

Maj. Gen. Eugene Reybold, Chief of Engineers, U. S. Army, says that in all basins over 23,000 officers and soldiers, using 10,000 pieces of their own equipment, including Army trucks amphibious jeeps, assault boats and landing barges, assisted in flood protection and evacuation work, in the past few weeks.

The entire levee system between Little Rock and Fort Smith, Ark., was severely damaged by the flood and must be almost completely rebuilt, the Little Rock District, U. S. Engineers Office has announced. Only one levee, the Faulkner Levee No. 1, constructed by the Army Engineers, withstood the flood. In most places entire levees were wiped out. Others were damaged so badly that repair is impossible and the entire structures must be reconstructed. Most of the levees were privately owned and maintained.

The job of raising and repairing the break in the Big Inch Pipeline under the Arkansas River, is now under way.

A 20-in. line was laid seven miles around the break during the flood and oil has been flowing through that emergency line since the week after the break was discovered. The temporary 20-in. line, which crosses the Rock Island railroad bridge will be taken up as soon as the break in the larger line is repaired.



Ohio highway bridge built well above flood waters

Located on a 4-mi. cut-off that eliminates several old bridges usually submerged during floods, this three-span, continuous steel girder bridge over White Water River on State Route 38, west of Cincinnati, is believed to be above all future floods. Three lines of continuous girders having 153½-ft. center spans and 150-ft. 9-in. end spans carry two 24-ft. concrete roadway slabs with a 7-ft. intervening mall and one 4-ft sidewalk. Outside girders are 90½-in. deep and the center girder is 108½-in. back-to-back of flanges.

The new structure is located adjacent to an existing railroad bridge and an abandoned interurban railway bridge. By removing a portion of the top of the old piers and abutments that carried the interurban line, and projecting new pier-caps and abutment-seats onto the old concrete substructures, satisfactory supports were provided for the far line of girders in the background.

Construction was started in 1941 and completed recently, the contractor being the J. and F. Harrig Co., Cincinnati. The Ohio State Highway Department was represented by P. F. Bookwalter, division engineer, C. W. Bachman, assistant division engineer and S. F. McCreadie, project engineer.

JOBS OF THE WEEK

APRONS, RUNWAYS and EXTENSIONS, Texas.
U. S. Engineers, Tulsa, Okla., awarded contract for aprons, runways extensions, and dust palliative, in Dallum Co., to Ottinger Brothers, Oklahoma City, Okla. The estimated cost is $500,000 to $1,000,000.

RUNWAYS, TAXIWAYS, etc., Texas.
Texas Bithulithic Co., Dallas, Tex., has been awarded the contract for runways, taxiways, apron and road, Victoria Co., by U. S. Engineers, Galveston, Tex. The estimated cost is $500,000 to $1,000,000.

BUILDINGS, Illinois.
J. Emil Anderson & Son, Chicago, were awarded the contract for constructing building in Cook County, when U. S. Engineers, Chicago, opened bids. The project will cost in excess of $5,000,000.

IMPROVEMENTS, Montana.
S. Birch & Sons Construction Co., Great Falls, Mont., will build facilities in Cascade County, at a cost to exceed $3,000,000. U. S. Engineers, Seattle, Wash., awarded the contract.

BUILDING, Nebraska.
Peter Kiewit & Sons Co., Omaha, Neb., has been awarded a contract for buildings, Phelps County, by the U. S. Engineers, Omaha, Neb. The estimated cost is $2,000,000.

BUILDING, Nebraska.
U. S. Engineers, Omaha, Neb., will construct buildings, in Redwillow County, at an approximate cost of $2,000,000. Peter Kiewit Sons Co., Omaha, Neb., has been awarded the contract for construction.

BUILDINGS, Nebraska.
C. C. Larsen & Sons, Council Bluffs, Ia., have been awarded a contract by the U. S. Engineers, Omaha, Neb., for buildings, Dawes County. Outside utilities contract was awarded to the Inland Construction Co., Omaha, Neb. Cost will be about $2,000,000.

PIPE LINE, Texas and Missouri.
Bechtel Co., San Francisco, Calif.; O. E. Dempsey Construction Co., Tulsa, Okla.; and H. C. Price, Bartlesville, Okla., will construct 120 miles of 26-in. natural gas pipe line carrier between a point near Amarillo, Tex., to Kansas City, Mo. Also 36 miles of 22-in. line paralleling part of main line at an estimated cost of $9,800,000. Panhandle Eastern Pipe Line Co., Bartlesville, Okla. and Kansas City, Mo., are owners.

BUILDING, New York.
U. S. Engineers, New York, N. Y., awarded contract for hospital conversion, Suffolk County, to Albert A. Lutz Co., Inc., New York, N. Y. The estimated cost is $1,000,000 to $1,500,000.

IMPROVEMENTS, Alabama.
Warren Brothers Roads Co., Birmingham, Ala., will construct improvements in Jefferson County for U. S. Engineers, Birmingham, Ala. The estimated cost is $2,000,000.

IMPROVEMENTS, California.
Ford J. Twaits Co., Los Angeles, Calif., will construct improvements in San Bernardino County for the U. S. Engineers, Los Angeles, Calif. The cost will exceed $1,000,000.

HOUSING, Virginia.
William R. Goss Co., Washington, D. C., has been awarded contract to build housing in Virginia by the Public Housing Authority, Washington, D. C., at a cost of $1,368,000. Faulkner & Kingsbury, Washington, D. C., are the architects.

MILITARY INSTALLATION, Idaho.
U. S. Engineers, Portland, Ore., awarded a contract for a military installation in Minidoka County to Brennan & Cahoon, Pocatello, Idaho. The cost will exceed $1,000,000.

ARMY AIR FORCE INSTALLATION, Ohio.
U. S. Engineers, Dayton, O., awarded contract for constructing army air force installation, Montgomery Co., to A. Farnell Blair, Decatur, Ga., the cost to exceed $2,000,000; also section of same project to Penker Associates, Inc., Cincinnati, O., cost to exceed $1,000,000.

Note—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 165.

W.E.P., Inc., Photo

Last major "shot" on the Big Inch pipeline

Fourteen tons of dynamite—one of the largest charges ever used in pipeline construction—last Friday cleared the solid rock from the center section of the Susquehanna River near Marietta, Pa., to make a channel for the crossing of the Big Inch pipeline.

The dynamite, 60 percent gelatin in 5 x 24-in. cartridges weighing 25 lb. each, was placed 14 to 16 ft. below the bedrock of the river. Seven cartridges were placed in each of 164 holes drilled at 4 ft. centers in each of two lines spaced 10 ft. apart, making about 90 lb. of explosive per lin ft. of trench.

In the picture above is shown the third major shot on the river crossing, which cleared about 350 ft. across the center section of the 1,800 ft. river. At this point the water was 14 ft. deep, dampening the throw so that rock was not scattered badly. Installation of the pipe will be started as soon as the broken rock is excavated from the river channel.

In addition to the Big Inch pipe, another pipeline of 20-in. dia., will be installed at this time in the same trench, although the balance of the second line is not yet under construction in this area.

Williams Bros. Corp. of Tulsa, Okla., is constructing the Susquehanna crossing and six other river crossings in the East. The work is being done under J. E. Humphrey, superintendent and D. E. Bell, engineer. War Emergency Pipelines, Inc., the government constructing agency, is represented in the eastern area by Geo. P. Brigance, division engineer.

OBITUARY

Arthur J. Matheson, 73, prominent Toronto, Ont., civil engineer, died there July 3.

Ralph Waldo Ridinger, 61, veteran Texas civil engineer, died at Denton, Tex., June 27. Mr. Ridinger served with the Texas highway department on many important projects. He later served Cooke and Montague counties, Texas, as resident engineer.

Frank Loth, 58, Sandusky, Ohio, assistant superintendent of the city waterworks department, died July 2.

Maj. Edward Douglas Park, 46, Dallas, Tex., engineer with the Army Engineer Corps died overseas recently. Major Park was educated at the University of Georgia and the United States Military Academy at West Point. He practiced his profession in Dallas with the Resettlement Administration. He later served in government defense construction.

Landon Scott, 60, director of public works of Danville, Va., died July 1, after having served for the past 15 years in the position he held at the time of his death.

Frederick M. Gahagan, 44, construction and hydraulic dredging engineer, who was president of the Gahagan Construction Corp. of Brooklyn, N. Y., died July 7. Mr. Gahagan returned recently from Panama where for about two years he had been overseeing projects for his company. Since his election to the presidency of the corporation and its affiliates in 1933, Mr. Gahagan had supervised the direction of contract operations with federal, state and municipal governments, railroads and private interests exceeding $30,000,000 in cost. Included in this work was the Ward's Island sewage disposal plant.

S. R. Russell, 63, senior technician in the explosive department of E. I. du Pont de Nemours & Co., who developed methods of blasting, particularly for clearing out big harbors, died July 8. He was one of the country's outstanding authorities on precision dynamiting. He served as consultant to the government on such projects as the deepening of Honolulu Harbor and supervised jobs in Canada and South America. Mr. Russell was credited with having exploded more dynamite in the last 36 years than any man in the country. He was often consulted on quarry blasting and is said to have perfected the method of tunnel blasting in open quarries.

Cecil Johnson, 53, civil engineer employed at the Charleston Ordnance Depot, Charleston, S. C., died July 3. He had worked for many years in the United States district engineer's office at Charleston.

Captain Maurice De L. Kearney, 41, died recently in Brooklyn, N. Y. He was with the Corps of Engineers, U. S. Army. Previously he had been on many projects, including the Holland Tunnel and the Delaware Aqueduct.

Aaron I. Raisman, 69, who was at the head of the designing division of the New York City Board of Transportation from its establishment in 1924 until his retirement in March, 1938, died July 11. After being graduated from Columbia University as a civil engineer in 1898, Mr. Raisman started as a rodman, transitman and assistant engineer with the Central Railroad of New Jersey, and two years later entered the employ of New York City Public Service Commission, and his advancement was rapid.

Samuel B. Milligan, 57, of Columbus, Ohio, employed as a structural engineer for Division 6 of the Ohio Department of Highways, died July 4.

CONTRACTS AND CAPITAL

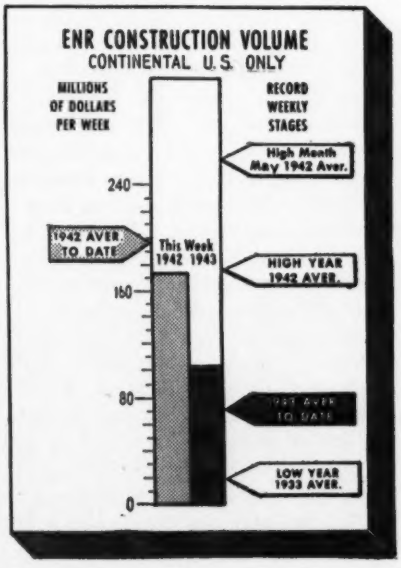
Civil engineering construction volume in continental U. S. totals $104,015,000 for the week. This volume, not including the construction by military combat engineers, American contracts outside the country, and shipbuilding, is 40 percent below the corresponding 1942 week, and compares with $42,002,000 for the preceding week. Private construction is 75 percent above the week last year, public work is down 46 percent, and federal construction is down 45 percent.

The current week's volume brings 1943 construction to $1,972,417,000, an average of $70,443,000 for each of the 28 weeks. On the weekly average basis, 1943 construction is 63 percent below the $5,698,849,000, for the 29-week period a year ago. Private construction, $243,926,000, is 33 percent lower than last year, and public work, $1,728,491,000, is down 66 percent when adjusted for the difference in the number of weeks.

In the classified construction groups, there is an increase in waterworks, streets and roads, unclassified construction and industrial and public buildings. All classes of work are lower than a year ago. Subtotals for the week in each class of construction are: waterworks, $3,572,000; sewerage, $1,437,000; bridges, $398,000; industrial buildings, $1,074,000; commercial buildings and large-scale private housing, $2,455,000; public buildings, $39,369,000; earthwork and drainage, $902,000; streets and roads, $10,844,000; and unclassified construction, $43,964,000.

New capital for construction purposes for the week totals $2,943,000. The week's new financing is made up entirely of state and municipal bonds.

New construction financing for the 28 weeks of 1943, $2,918,015,000, compares with $7,801,129,000 for the 29-week period in 1942.



CONTRACTS
Continental U. S. Only
(Thousands of dollars)

	Week Ending July 16 1942	July 8 1943	July 15 1943
Federal	$156,351	$36,141	$85,425
State & Municipal	10,073	2,766	5,106
Total public	$166,424	$38,907	$90,531
Total private	7,705	3,095	13,484
TOTAL	$174,129	$42,002	$104,015
Cumulative 1943 (28 weeks)			$1,972,417
1942 (29 weeks)			$5,698,849

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1942 29 weeks	1943 28 weeks
NON-FEDERAL	$519,353	$264,177
Corp. Securities	150,959	15,321
State & Mun.	158,275	88,723
R.F.C. loans	127,419	9,000
FPHA loans	.....	3,133
R.E.A. loans	.....	20,000
Fed.-Aid Hwy.	82,700	128,000
FEDERAL	$7,281,776	$2,653,838
TOTAL CAPITAL	$7,801,129	$2,918,015

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost	July '43	289.92	139.36
Building Cost	July '43	227.89	123.19
Volume	June '43	204.	89.

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

Specific Postwar Planning

Sir: As an enthusiastic supporter of postwar planning and design programs along the lines recently enunciated in your editorial columns, I feel certain that *Engineering News-Record* can be of very decided service to engineers in particular, and to the United States in general, by continuing to enunciate definitely, by editorials and articles, rational postwar planning programs and careful economic design details of the following general nature: (a) Immediate completion of detailed construction plans and specifications for really needed public and private construction; (b) projects of general utility service and safety standards to be given precedence over luxury bracket projects; (c) careful sliding-scale service designs for different conditions, as contrasted with rather general, standardized procedure; and (d) the use of a peacetime economic service-return yardstick as a basis for designs, rather than unrestricted wartime expenditures, with the sky the limit.

After the last war (1920 to 1940), the entire country suffered from lack of advance planning of needed public works, and also suffered from a war psychology holdover; returning veterans, placed in charge of public works, felt that if unrestricted expenditures were permissible in war, they were even more justifiable in peace. A wellknown result, in this locality at least, was that $50,000 a mile was spent on a considerable mileage of unimportant state road construction, on which the volume and character of traffic is so small, even today (20 years later), that a $20,000-a-mile road would serve all economic needs. Also, dangerous deep ditches were used, over local protests, because in France, in 1917, such ditches were occasionally very useful as "fox holes" to escape machine gun fire, etc.

We do not want this procedure to be repeated again, as it already is being repeated in luxury-bracket postwar plans now being prepared by some states and cities. Future returning veterans are very likely to apply similar concepts again.

I sincerely hope these suggestions will be useful to you, as I like *ENR* and believe you are doing an excellent job in distributing valuable and reliable engineering data and rational policy discussions.

W. G. HARGER
Retired Highway Engineer
Rochester, N. Y.

Tacoma Narrows Bridge

Sir: It is with a feeling of relief and satisfaction that the writer notes, in *ENR*, June 10, p. 852, a statement that the plans for the new Tacoma Narrows Bridge call for a stiffening truss 33 ft. deep in place of the 8-ft. deep plate girders of the former design.

On Dec. 11, 1940, the writer addressed you with some comments upon the causes of the failure which had occurred the previous month. For reasons ascribed by you to the need for brevity, you omitted the last paragraph of that letter when it was published (*ENR* Jan. 2, p. 8). He would be gratified if you would now publish that paragraph, which is quoted below:

"The lesson to be drawn from the failure is not a requirement that suspension bridge designs be examined critically for extreme aerodynamic effects, but rather that designs follow lines which have been thoroughly tested and found fully adequate. Neither aesthetic nor economic reasons in the case of a bridge intended for public traffic will justify a design which is not beyond question as to its safety and its freedom from objectionable or alarming behavior. A radical departure from accepted and proven practice should not be adopted without reasonable certainty that these conditions are fulfilled. In the case of the Tacoma Narrows Bridge, by far the most extreme ever built as to depth-to-span ratio (1/350), and probably also as to width-to-span ratio, the previous experience with the Bronx-Whitestone Bridge (ratio 1/210) and the smaller Thousand Islands and Deer Isle bridges would seem to have provided a sufficient warning to exercise the greatest caution."

On Nov. 14, 1939, at a meeting of the Philadelphia Section, A.S.C.E., devoted to a discussion of the recently completed Bronx-Whitestone Bridge, the writer presented the following list of important suspension bridges with their ratio of depth to span length.

Bridge	Ratio: Dept of Truss to Span Length
Bear Mountain	1/54
Delaware River	1/62
Mount Hope	1/67
St. Johns	1/67
Triborough	1/69
Poughkeepsie	1/75
Oakland Bay	1/77
Isle of Orleans	1/81
Detroit	1/84
George Washington (final)	1/121
Golden Gate	1/168
Bronx-Whitestone	1/210
Tacoma Narrows	1/350

He expressed the opinion that the behavior of the Bronx-Whitestone Bridge indicated the probability that this ratio had been carried too far, and stated emphatically his disapproval of the ratio 1/350 for the proposed Tacoma Narrows Bridge, then under design.

On Nov. 7, 1940, almost exactly one year after this discussion the Tacoma Bridge failed.

On March 10, 1941, at a meeting of the Philadelphia Section presided over by the writer, this list was again adduced and the writer's previously expressed views were once more presented.

In Engineering News-Record, March 5, 1942, p. 376, a news note stated that the Bronx-Whitestone Bridge was to be reinforced by adding a stiffening truss above each of the 11-ft. plate girders making a truss 25 ft. deep. This change, the writer is informed, has been deferred because of steel shortage.

These two applications of "second thought" to design, considered in conjunction with the unsatisfactory performance of certain other suspension bridges mentioned in the paragraph quoted above lead the writer to hope that the epidemic of what may be termed "freakish" designs for suspension bridges, departing radically from the proportions satisfactorily in use for many years, may have been permanently checked.

Another feature of interest in the new design as described in the news

report of June 10 is the apparent adoption of a deck structure, with the truss 33 ft. below the concrete deck, the towers being made 56 ft. higher. This was the type used for Bear Mountain Bridge, which has proven exceptionally free from wind vibration. Undoubtedly deck construction with effective cross frames below the floor, and top and bottom lateral bracing, is a highly desirable means for accomplishing such a result although it is comparatively seldom adopted in practice.

FRANCIS P. WITMER
Cynwyd, Pa.

Two Postwar Suggestions

Sir: In *Engineering News-Record*, June 24, 1943, p. 920, you note a meeting of the American Planning & Civic Organization of Washington, D. C. As an industrial engineer I would like to add a suggestion concerning postwar work that I have not heretofore seen discussed.

Those previously attempting to "make work," say in the 1930's, seem to have confined their thinking much too largely to civil and architectural engineering projects, the work being pretty well limited to roads, dams, power projects, water supply, flood control, forestry and housing.

The engineering staff of every successful manufacturing concern generally has a large number of projects in its files that will make for economy in manufacturing, better work, better health conditions, better safety, etc., for which financing cannot be obtained. Many of these projects are border-line cases where changes in business conditions, process and tax situations, make the return too small for the management to risk stockholders' money. This is particularly true at present in connection with chemical industries, where an indicated return of capital in 5 years hardly warrants the initial investment.

Some of the improvements that could be added would distinctly improve sanitary conditions, make for better living, purify streams, etc. One can't put a money value on these, yet they ought to be carried out. If forward thinking of industrial engineers can be brought into the picture, I believe that the number of visible projects which will give employment will be ten times greater than if forward thinking is confined to public works only.

My thought is that government officials should be shown this picture, and special tax legislation carried out to make any profits from these border-line cases virtually non-taxable. Such a course will remove one uncertainty from the mind of management.

The second suggestion is that governmental assistance be given for such projects. A good many companies have not the financial strength to carry out some of the projects which, from the social point of view, should be carried out. Government funds ought to be made available for such projects, just as they are now made available for better homes.

It is recognized, in making this second suggestion, that there may be a further descent of officials, comptrollers and engineers investigating technical processes, of which initially they frequently know nothing, to see whether the lending of government funds is warranted. However, we now have this crop of investigators to a considerable degree in connection with war material projects, certificates of necessity, etc.; probably their number after the war for the type of investigation mentioned would be appreciably less than their present number.

GEORGE E. WADLEIGH
Industrial Engineer
Hastings-on-Hudson, N. Y.

A Good-Neighbor Policy

Sir: In *Engineering News-Record*, Dec. 3, 1942, p. 765, under the heading "Keeping Up the Supply of Engineers," the editors consider the different aspects of education and training problems in wartime. I am writing you, not to give any opinion on such matters, but to express my belief that some Latin-American engineers, whose professional possibilities have been limited because of the shortage of construction materials and machinery, are capable of working in the United States.

As a matter of fact, the education and background of Latin-American engineers are different in many respects from those of American engineers. However, I believe that a few months of training, for those who know some English, may enable many of them to co-operate in the engineering undertakings connected with the Allies' war program.

The advantages of such a policy would be: (1) politically, the effective work of Latin-American citizens in the war effort of the United States, which would aid the friendly good neighbor policy; (2) returning to their countries, after the war, the knowledge and experience obtained would allow the Latin-American engineers to disseminate American methods in engineering, thus tending towards a greater use of American materials in Latin-America; (3) it would be possible, after the war, for United States investors in Latin-American countries to work with engineers who are aware of the opportunities in their respective countries, and who have been previously connected with American enterprises.

ALBERTO BELAUNDE G.
Civil Engineer
Lima, Peru

WPA Versus ENR

Sir: I wish to express my full accord with the letter by Lt. Col. Hugh A. Kelly (*ENR*, July 1, p. 8), in which he condemns your editorial of last Dec. 17 entitled "The End of W.P.A." He has abundantly proved his six points, demonstrating the inaccuracy and obvious injustice of your original editorial.

It seems to me that you should admit your emotional unbalance and evident unfairness in your previous mass condemnation of those doing their best to preserve men's self-respect in the face of the stark reality of unemployment and the breakdown of our economy.

May I also add my commendation and emphasize strongly his appeal for active effort to "develop a program of necessary public projects." The prospect of complete chaos after this war unless far better planning is done than after the last war must be obvious. "Agony of body and travail of soul" will come again unless we do more than rely on prayer and faith in the old "normalcy." The astounding accomplishments of engineers in the service of war must be duplicated in the service of peace after the war. Only by radical changes as required to apply the lessons learned in wartime can this be done—and *it must be done.*

J. P. J. WILLIAMS,
New York City

EDITORIALS

VOLUME 131 NUMBER 3

July 15, 1943

Bargain Rates for Consultants

ALMOST LOST among the billions of dollars written into the recent Army and Navy supply bills is a provision limiting the Army and Navy to payment of not over $25 a day to consultants engaged on a per diem basis for engineering work. Such a fee is far below the earning capacity of the very type of engineer that the government needs when it must seek the advise of consultants. It makes no allowance for even the barest overhead. Now that this limit is on the statute books, engineers are faced with a difficult problem. Will they decline to act as advisers to the Army or Navy for such a fee on the ground that it is inadequate compensation for their services, or will they accept the low fee on the assumption that they must respond to a call to public service. And if they accept such fee from the federal government, how long will they be able to charge much higher fees to states and cities for like services? And how will members of the American Institute of Consulting Engineers justify acceptance of such fees when their codes of practice sets a minimum per diem fee of $100? Does this action by Congress indicate that the day of the higher per diem fees is passing, except to private corporations who know that even the higher fee is but a small price to pay for high-grade engineering? These are questions to be faced by the council of the American Institute of Consulting Engineers and the board of direction of the American Society of Civil Engineers. The individual consultant needs to be guided by the collective thinking of the whole group if chaos is to be avoided.

Skill Saves Money

DRYDOCK CONSTRUCTION has become almost synonomous with a long and expensive engineering job. But slow and costly is not the proper characterization for work on four large drydocks for ship repair and construction at Tampa, Fla. There, the slow and costly work of building heavy concrete floors and walls that resist hydrostatic uplift by sheer weight was eliminated, the heavy walls being replaced by thin concrete walls under which buoyancy is relieved by wellpoints that are operated continuously. Also, building of the walls of the basins served as a training ground for crews needed later for pouring concrete in the thin walls of concrete ships to be built in the basins. An article in this issue describes the project where trainloads of material, months of time and much taxpayer money was saved by application of advanced principles of drydock design and foundation engineering.

Value of Demountability Proven

BUILDERS FAVORING WAR HOUSING of the demountable type will be encouraged by the salvage of the buildings formerly used at several midwest CCC camps. This work, which is described on p. 92 of this issue, not only showed that the percent of salvage can be high, but that the cost need not be great nor the breakage large, although the buildings are moved long distances. Other experience with demountable prefabricated houses, resulting from tests conducted two years ago by the Federal Works Agency at Indianhead, Md., confirm these findings. It also is worth while to note that the federal government, which is often criticized for lack of planning to permit salvage, cannot be so criticized on this work. When these CCC camps were built, someone had the forethought to realize that moving the camps as some time in the future might be highly desirable.

Sewage Treatment Plant Models

SYMPATHETIC APPRECIATION of the difficulties involved in understanding the functions and operation operation of sewage-treatment processes has prompted the Repairs and Utilities Branch of the Army Engineers to develop a model for the instruction of plant operators. As described elsewhere in this issue, this model of a complete plant shows the units in their true scale, with cut-away sections illustrating construction details; and it has the further special virtue of showing underground piping and other facilities that are generally buried from view. Designed primarily for the instruction of operators who are not expert in the reading of blueprints, the model's usefulness goes far beyond the needs of this group in providing opportunity for three-dimensional study of the complex structures and processing arrangements used in sewage treatment. Wider use of models of this kind might well reveal possibilities for improvement of structural layout, flow design and placement of underground facilities, that are not now apparent.

Farming-out City Engineering

INDICATIVE of the thinking of many engineers in civil service is the court action brought by the Civil Service Technical Guild to compel the mayor of New York City to abandon the practice of employing outside engineering and architectural firms to prepare plans for part of the city's postwar construction program. The guild's appeal to the courts follows an appeal of last May by the Municipal Engineers Society of the City of New York to the Board of Estimate to instruct the mayor not to employ outside firms for such work until all available men on the civil service preferred list had been given employment. The guild holds that employment of outside firms for such work is a violation of the state constitution, apparently on the assumption that the civil service law limits all city work to people who have taken the competitive civil service examinations, thus precluding the letting of any city work to outside contractors.

The desire of the civil service engineers to see that their colleagues who are out of work be given employment before work is given to outside firms is natural and understandable, but an analysis of the situation leads to the firm conclusion that putting them back under conditions proposed by the guild will not be in the public interest. Certainly, the argument that the guild appears to put forward that the state civil service law limits public work only to those who have passed civil service examinations is not in the public interest. The civil service laws of our federal and state governments were put on the statute books to protect civil employees from being supplanted by political appointees, not to create a preferred class of citizens who have a special claim to all public work.

TWO BASIC OBJECTIONS to this proposal to limit public work to civil service employees are that it tends to increase costs of public work and that it takes from city executives the power to administer municipal affairs with maximum efficiency. Speed also is an important factor. Assume that the city decides to build a new parkway. By the time the park department staff has been expanded to carry the extra load it is likely that a private firm of engineers could have the plans well under way. And when the job is done the engineering cost ceases, whereas in an expanded park department there is a strong tendency to retain the added men.

Another undesirable result of temporary expansion of one of the city departments is its effect on some of the civil service men in those departments. Under civil-service seniority regulations, the seniority of men taken on is their seniority in city service, hence when layoffs come some of the new men may displace key men in the department.

All of which is not to say that there may not be some justice in the plea of the Municipal Engineers Society that no work be let to contract while men on the preferred list are out of work. Complete absorption of these men may be too extreme a demand, especially in view of the fact that many are not design men. Under pressure from private firms needing work, the city officials may have let more work to contract than would have been let under other circumstances. If so, the high percentage of unemployment among former employees could be corrected without resort to the drastic change in policy called for by the guild.

LOOKING BEYOND THE ISSUES raised in New York City itself, statewide or nationwide limitation of engineering work to civil service employees would have a disastrous effect on small cities and towns with very limited engineering staffs. These towns depend on private practitioners for the design and supervision of construction of water supply and sewage disposal systems, bridges and special structures. Further, there is much to be said from a national viewpoint on the importance of using part of the work of the larger cities to supply a regular flow of business to municipal consultants so that they may continue to be available to the smaller communities when needed.

Another aspect of this matter that needs to be carefully weighed in deciding to farm-out part of the engineering work is the desirability, in a large city having permanent engineering staffs, of giving those staffs an opportunity to develop engineering talent through the design of new facilities. All the cream should not be skimmed off and given to outside engineers. If city departments are to attract and hold men whose ability will raise the engineering work of the departments to a high level of efficiency, there should be opportunities to exercise engineering ability and initiative. Employment of outside firms to carry peak loads or for special jobs will check overexpansion of the staff, creating situations like the present one, and will bring to the staff the stimulant that comes from contact with outside engineering firms.

ENGINEERING NEWS-RECORD WALDO G. BOWMAN, *Editor* *Copyright, 1943, by McGraw-Hill Publishing Company, Inc.*

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Taxicabs in the Yukon?

By John Abbink Publisher, Engineering News-Record

IN THE LAST FEW MONTHS I've discovered a new and fascinating system to keep me posted on the activities of the editors of *Engineering News-Record*. They are moving in, out and over the country so fast these days to get on-the-site, up-to-the-minute reports on engineering construction projects all over the globe that I don't have much opportunity to talk with them. Therefore, I sought some form of regular contact—and someone offered the suggestion that I make a regular perusal of weekly expense accounts!

These little seven-page documents from the *ENR* editors, I find, are storehouses of information that tell of places visited, miles traveled, people seen, and a host of other things. For example, in one of Editor Richardson's entries during his Alcan Highway assignment last fall I found, "Taxi fares in the Yukon, $18.43. (Note to Acctg. Dept.: There are no cabs up here, but the contractors who drove me over the project did introduce me to a brand-new kind of poker.)"

This item, along with many others describing charges for passports, overseas equipment, immunization against diseases, etc., project a vivid, behind-the-scenes picture of the editorial activities of *Engineering News-Record*.

ALL OF THIS REFLECTS a carefully defined policy based on this premise: Engineering and construction practice is in the midst of a major period of evolution. In battle, as in the preparation for war, engineers and contractors are going places and doing things that heretofore were undreamed of. Not only have they introduced countless new materials and methods, but they are carrying out construction operations with American ingenuity and equipment at home and in virtually every part of the globe. All of this is having a tremendous impact outside of the United States, and it will profoundly influence overseas construction activities in the postwar period.

At the same time we are learning important lessons from our friends in foreign lands, the results of which should vitally affect—and broaden—some concepts in our own engineering practice. This will become increasingly evident when reconstruction gets under way. For example, the rehabilitation of bombed cities is going to provide those abroad with an unequalled opportunity to build new communities that are designed for living in a modern age. And from these experiences we must borrow and adapt ideas to guide the urban rehabilitation that has long been overdue in this country.

This, in brief, sketches an opportunity and a challenge—new horizons, if you please—for the engineers, contractors and equipment manufacturers of the United States. More than ever must they rely on prompt, interpretative reports of significant developments in both domestic and foreign fields of civil engineering activity.

IT IS TO THIS BROADENED RESPONSIBILITY in the coverage of world-wide engineering that *Engineering News-Record* has been giving increasing attention.

Maintaining the prestige acquired in 69 years of engineering journalism, the editors of *News-Record* are gathering the information by means of which the construction industry will be aided in charting new horizons for the postwar period. Traveling more than 140,000 miles a year, these editors are able to write with the conviction of first-hand knowledge; and their reports not only are newsworthy, but they reflect as well the balanced judgment that comes from wide contacts.

Increased emphasis on foreign coverage does not mean, however, that our attention to domestic activities will be diminished. During the past twelve months staff editors have covered construction projects in every active construction area in the Union.

In broadening its coverage both in this country and overseas, I feel safe in saying that no other technical publication has gone or will go as far as *News-Record* to bring to its readers first-hand reports of what is new and what is developing. That this is fact and not merely promise, I point to present outside-the-country assignments of four editors as listed on the opposite page.

IT IS NOT WITHOUT SOME PRIDE that I recall that an *Engineering News-Record* editor was the first man—either Army or civilian—to traverse the entire length of the Alcan Highway and to make a complete report on its construction. Again, on the Inter-American Highway project through Central America, this journal is the first to dispatch an editor to the scene for a complete story on engineering problems and construction methods in the tropics. And very soon we will publish the accounts of engineering accomplishments witnessed by other staff editors covering European, Near-East and Latin-American countries—perhaps even in the Pacific zone of military operations—as well as those noteworthy projects on the home front.

Mark Twain complained regarding the weather that "Everybody talks about it, but nobody *does* anything about it." Planning for the postwar period has had a lot of lip service too. But *ENR* is *doing* something about it.

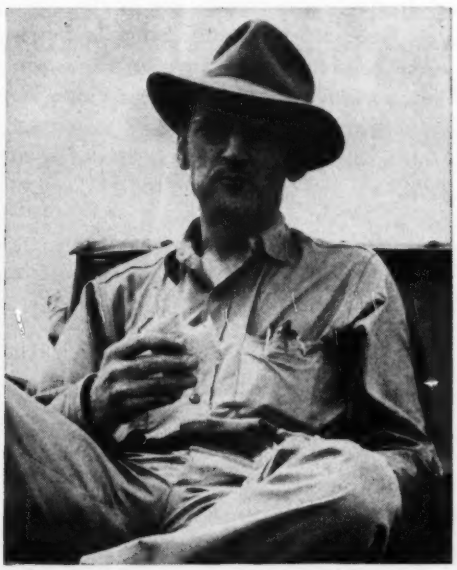
★ ★ ★ ★ ★ ★ ★ ★ ★

ENR Editors on Foreign Assignments

ENGLAND AND THE NEAR EAST—*Waldo G. Bowman, chief editor, is now in the British Isles to observe the many operations of our Army and Navy engineers and to report on such of those activities as can be made public at the present time. He also plans to study British plans for postwar construction and reconstruction. From England Mr. Bowman expects to go to North Africa, Egypt, Iran and Iraq to get first hand knowledge of military engineering, highway, railway and marine construction in those theaters of operation. He expects to be abroad until late September.*

LATIN AMERICA—*Edward J. Cleary, managing editor, is making a tour, largely by air, that will take him to nine South American and Caribbean countries where engineers from this country are engaged on sanitation and public-works operations and in helping speed the development of natural resources for war use. He also will report on construction activities of the U. S. Corps of Engineers and the Army Air Forces. A side trip will be a visit to the Ford Motor Co. rubber plantation at Belterra, Brazil. He will be gone from this country for about two months.*

ALASKA AND THE YUKON—*Harold W. Richardson, western editor, is making his second trip to Alaska and the Yukon to see how well the Alaska Military Highway stood up under the rigors of winter and to report on permanent bridge work for the big river crossings. He also will visit the highway and pipeline construction now being pushed to bring out oil from Canada's spectacular new fields in Northwest Territory for use by military forces in Alaska. If conditions permit, he will also visit military engineering operations in Alaska. Richardson will be gone until mid-August.*



CENTRAL AMERICA—*Archie N. Carter, assistant editor, has just returned from a 13,000-mile trip that took him down and back over the entire 1,500-mile length of the Inter-American Highway from the southern border of Mexico to the Canal Zone. Engineers and contractors from this country, assisted by the local highway departments, are opening a road through Guatemala, El Salvador, Honduras, Nicaragua and Costa Rica to Panama under a variety of difficult conditions that will be reported in articles soon to be published in these pages.*

Fig. 1. More than 105,000 gpm. was continuously pumped from the first cofferdam for TVA's Douglas Dam to unwater it.

Douglas Dam Constructed in 13 Months

***Contents in Brief**—Water falling from above, coming in from the river and up from the foundation added unexpected difficulty to the fastest major dam construction schedule ever undertaken. Plans, equipment and key personnel were taken bodily from the Tennessee Valley Authority's nearly completed Cherokee project to permit a rapid start on construction. Despite water delays of weeks, the dam was closed a few days ahead of its 13-month schedule, to add immediately 100,000 kw. of power to the low water capacity of TVA's electric system.*

"BUILT IN LESS THAN 13 MONTHS despite hell and high water"—might well be the brief report on construction of Douglas Dam by the Tennessee Valley Authority. When it became apparent that only by construction of this dam on the French Broad River could a serious shortage of electric power be prevented in this area of growing industries, the dam was authorized Jan. 30, 1942 on the promise of TVA engineers that it would be ready to store the spring floods and add 100,000 kw. to the valley's electric system in 1943. Closure was made in mid-February of this year and power output started the same month.

Douglas Dam has a spillway section 505 ft. long with 11 Tainter gates, 32 ft. high by 40 ft. wide; two non-overflow sections, 864 ft. long; powerhouse intake section, 313 ft. long; a total length of concrete dam of 1,682 ft. The project includes the construction of eight earth saddle dams around the rim of the reservoir.

While no two sites are ever exactly alike, there is unparalleled similarity between the site at Douglas and at Cherokee Dam. At the time TVA promised 13 month completion of Douglas Dam only preliminary plans for the structure were available but this lack was overcome by adapting the plans for Cherokee Dam, then nearing completion on Holston River only 40 miles away, to the Douglas site. The length of Cherokee's concrete section fits the width of the French Broad River at the Douglas site almost exactly. Stream flow is greater at Douglas but by the addition of two spillway openings the Cherokee design, including the gates, could be used.

And the powerhouse at Douglas could be made an exact duplicate of that at Cherokee including the turbines, generators and cranes. The tailwater range is sufficiently similar so that the same discharge design could be adopted at Douglas. Douglas Dam is not as high as Cherokee and the total concrete is about 548,000 cu.yd. compared to 687,000 cu yd. placed at the earlier structure.

Probably the greatest single factor in getting power directly from Douglas Dam on the line was the "borrowing" of a unit already on order and partially delivered at the Cherokee project. This one unit was speedily installed but it supplies only a part of the 100,000 kw. increase in TVA's available power, re-use of the water downstream at the seven main river plants now in operation making up the difference.

The problem of plans, equipment and personnel for Douglas Dam was solved largely by transferring almost the complete organization and plant

from Cherokee Dam. Materials of all kinds were difficult to secure, a condition met in part by taking 40,000 logs from the reservoir for use in the cofferdam and by establishing a sawmill at the job site where logs from the immediate area were delivered one day, sawed, sized and, in many cases, nailed into forms or temporary structures the next day.

Water was only difficulty

Water hampered the project to such an extent that all other construction difficulties seemed trivial by comparison. First it was rain, delaying the preliminary work, then it was an over abundance of water in the cofferdam. Overtopping did not occur, but leakage was such as to make this probably one of the greatest cofferdam pumping jobs of all time.

River diversion for construction was accomplished in two stages. The first required a cofferdam extending from one bank to within 113 ft. of a rock bluff at the other bank. The first cofferdam included the powerhouse, intake and seven and one-half of the eleven spillway blocks. Two of the spillway blocks were left low during the first stage of concreting to pass the flow of the river during the second stage of construction.

First-stage cofferdam

The first-stage cofferdam was designed to protect construction against a 60,000-cfs. flood, which has a frequency of once in three years. The second-stage cofferdam was designed to pass only a 30,000-cfs. discharge but it was in place for only a little more than one month.

An earth-and rock-filled log crib cofferdam was used around the construction area. The cofferdam was roughly as wide as it was high, 30 to 46 ft. and was made of logs from the reservoir fastened together by ¾-in. drift pins to form rectangular cells that were divided into three sections longitudinally. The middle section, from rock bed to top, was filled with clay and the outer two sections were filled with broken rock. The central section, and generally the section in contact with flow of the water was lined with sheathing of rough 1-in. boards. The clay served as an impervious water stop while the rock gave stability and weight.

Knox dolomite limestone underlies the dam site, varying from fine to coarse crystalline with many thin lenses and beds of chert occurring through the formation. Beds dip about 20 deg. from the horizontal and their strike is nearly parallel to the river flow. Since dolomite limestone is a highly soluble rock both open and clay-filled cavities are numerous. The flow of the river, being roughly parallel to the strike of the rock, has favored solution and much of the upper 30 ft. of rock under the river channel is highly cavernous. Below that depth there is sound rock though very small seams exist. The cavernous top rock has been removed and the minor seams, below final excavation grade, have been grouted to seal them. However one seam, under an abutment, with a maximum depth of about 3 ft. lying under 40 ft. of excellent rock, was cleaned and concreted through 36-in. calyx drill holes.

Because of the cavernous rock, un-

Fig. 2. Asphalt grouting, usually successful locally, did not completely stop this inflow of water. Note the asphalt forced through seams of the rock.

Fig. 3. Many discharge lines may be seen as Douglas Dam engineers dry up small sandbagged area in right foreground preparatory to concrete placing.

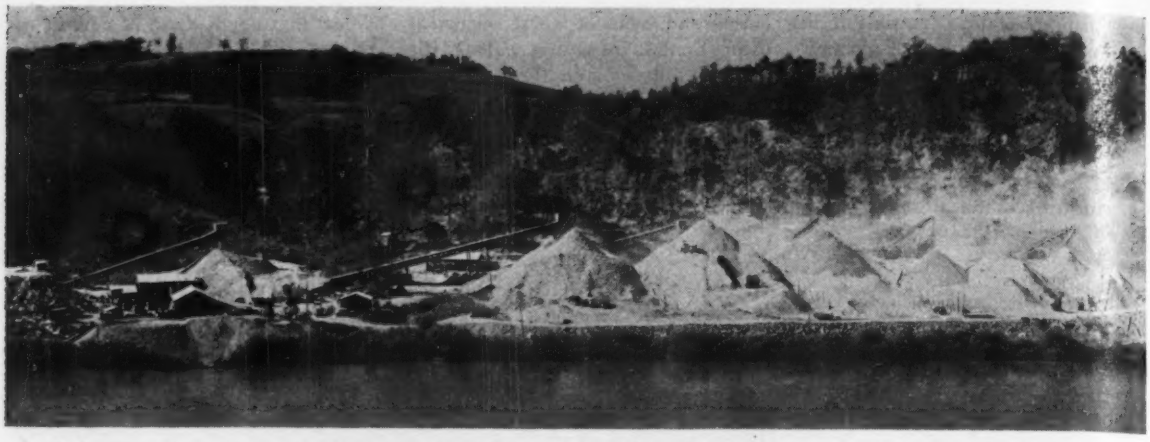


Fig. 4. Aggregates were produced by private contract adjacent to the site of the dam. A gyratory crusher, two cone crushers, a rod mill and a ball mill produce both fine and coarse aggregates. A tunnel under the stockpile permitted reclamation of aggregate by a belt conveyor for transfer to the concrete plant.

precedented difficulty was experienced in unwatering and keeping the first stage cofferdam sufficiently dry to permit excavation. Extensive blanketing upstream and downstream from the cofferdam crib and use of loop dikes to enclose probable intakes were tried and were partially successful.

Asphalt grouting also was used and was usually successful locally. In some cases, where channels were stopped, increased pressure forced erosion of other channels so that leakage into the cofferdam continued in excess of 80,000 gpm.

In one instance a rise in the flow of the river increased the head on the cofferdam resulting in water rising faster than the pumps could remove it and forced a decision to flood the cofferdam. While the cofferdam was flooded, known crevices in the formation below were thoroughly clay-cement or asphalt grouted. Ten diamond core-drills, eight asphalt kettles and two clay-cement grout machines were operated 24 hours per day during the period the cofferdam was unwatered. (Grouting below the cofferdam on the entire project used 33,000 bbl. of asphalt and 179,000 cu.ft. of clay-cement.)

Resumption of pumping after the river had gone down indicated that many of the old leaks were still there and, while there was some indication of improvement, pumping in excess of 60,000 gpm. was required continuously. A dry foundation was obtained by isolating small sections of the foundation with sandbag or other dikes and pumping out small areas for concrete placing.

At one time five 18-in., fourteen 16-in., six 12-in. and many smaller pumps were operating to keep the first cofferdam dry. Actually 36 pumps with 6-in. dia. and larger discharge were in use with a combined capacity in excess of 120,000 gpm. Double lifts of pumps were used in many cases as it was necessary to pump more than half of the water over the upstream side of the cofferdam, a total height of 80 ft. In addition to the major pumps, a large number of sump and other secondary units were used to keep the water from the small areas that were successively isolated for concrete operation.

Conventional cement grouting was employed under the dam to assure tight closure of the rock structure. Under the concrete dam a grout curtain parallel to the axis and close to the upstream face of the concrete protects the structure from underflow and cutting. This curtain reaches a depth of 100 ft. below the foundation, being formed by grouting closely spaced holes at pressures ranging from 75 to 200 psi. The foundation under the entire dam is consolidated to a depth of 40 ft. by cement grout injected into holes drilled on a regular pattern to reach all of the area and washed prior to grouting.

Construction plant

The permanent installation at Douglas Dam is served by a standard gage railroad built six miles to the job from the nearest rail connection. It crosses the French Broad River on a combination railroad and highway bridge made from steel girders salvaged at Cherokee Dam.

Concrete aggregates were manufactured on the site under a private contract, limestone from a TVA quarry being processed for both coarse and fine material. The plant consisted of a 42-in. gyratory primary crusher with a conveyor to a raw storage pile from which material was fed to a 5½-ft. and 4½-ft. cone crusher for secondary crushing.

Conveyors transported the material to a successive series of double deck screens, each of which removed one size of aggregate and fed it to a fixed stacker 110 ft. long that put the material in storage over a reclaiming tunnel. At the end of the conveyor line were a rod mill, ball mill and washer for manufacturing sand. Maximum aggregate requirements were more than 150,000 tons monthly.

The aggregates were reclaimed from the bottom of the storage pile by TVA forces and carried on 36-in. wide belt conveyors about half a mile to the dam. Here, they were delivered directly to the top of a large concrete plant, which had storage for three hours of operation.

Cement was received in bulk on the job in box cars and was unloaded by power scrapers into hoppers, which fed the cement to two mass-flow conveyors that delivered it to two bucket elevators. These elevators fed either the cement bin in the mixing plant or an adjacent cement storage silo. Cement, aggregate and water were batched by weighing and charged by gravity to a battery of three 4-cu.yd. front-end charging tilting-mixers.

Concrete on the project was made with a modified type "B" cement in two main classes, "mass" concrete for the interior of the gravity section,

and "face" concrete for use at the exposed surfaces where durability is essential. The mass concrete had a water cement ratio of about 0.75 by weight and a cement content of 0.85 bbl. per cu.yd. The face, or exposed concrete, had a water-cement ratio of 0.55 by weight and a cement content of 1.15 bbl. per cu.yd.

The basic scheme for handling concrete called for a 93-ft. high steel trestle, 1,135 ft. long with a wide deck supporting three standard-gage railroad tracks and a 30-ft. gage track for heavy cranes. The trestle and most of the equipment came from Cherokee Dam. Centerline of the work trestle was 94 ft. downstream from the upstream face of the dam and the deck elevation was 946, the top of the dam being at El. 1006.

Those parts of the trestle that were to be embedded in the dam, corresponding roughly with the metal left embedded in Cherokee Dam, were built of reinforced concrete resting on the rock foundation of the dam. Four full-revolving, electric-driven, self-propelling cranes were used on the construction. Two of the cranes generally were used on placing of concrete and two for handling forms, structural steel and embedded material. Capacity of each crane was 11 tons with the 125-ft. boom laid flat.

Ten-ton standard-gage diesel and diesel-electric locomotives hauled concrete and other materials out over the dam. Concrete was placed by filling three 4-cu.yd. buckets on a railroad flat car, run directly under the mixer plant, and hauling it out to a position under the crane for placing. The railroad car had space for an empty bucket, in addition to the three full ones, so that the first operation of a placing cycle was to set the empty bucket on the car, moving the hook to the first full bucket. Three trains, of one car each, were in operation simultaneously, hauling to the two placing rigs.

For the first time on a TVA project, cantilever forms were used for this dam. (*ENR*, April 22, 1943, p. 562). Absorptive form lining was used on the downstream face of the spillway.

Some artificial cooling

Concrete was normally poured in 5-ft. vertical lifts with a 72-hr. time interval between pours. To expedite concreting, an artificial cooling system, using embedded pipe placed on 5-ft. centers both vertical and horizontal, was used. For closure sections and in other "rush" spots an artificial cooling system was used, water pumped from the river proving sufficiently cool to produce the effect desired on the concrete. Small pipe were embedded horizontally at 5 ft. c. to c. and at 5-ft. vertical lifts.

Use of the cooling system allowed concrete to be placed in strategic places in 10-ft. lifts with a 48-hr. time interval between lifts. The cooling system provided the same protection against excessive heat of hydration as was previously obtained with 5-ft. lifts and a 72-hr. time interval.

Filling the reservoir this year demanded that the sections of the spillway left low for passage of flood waters be placed as rapidly as possible. Concrete was poured in the two closure blocks continuously from El. 878 to El. 937, the start of the spillway crest. Pouring operations were stopped at each 5-ft. of rise long enough to place a layer of cooling pipe and anchor the forms for the next 5 ft., but not long enough to allow a "cold joint" or to require cleaning. Concrete poured at the fast rate appears to be equal in quality to concrete placed at the slower rate usually required.

Closure was made by dropping specially designed reinforced concrete gates into vertical slots, made by steel beams previously embedded upright along the upstream face of the dam. Nine precast gates were used, each about 12 ft. wide and 18 ft. high, and

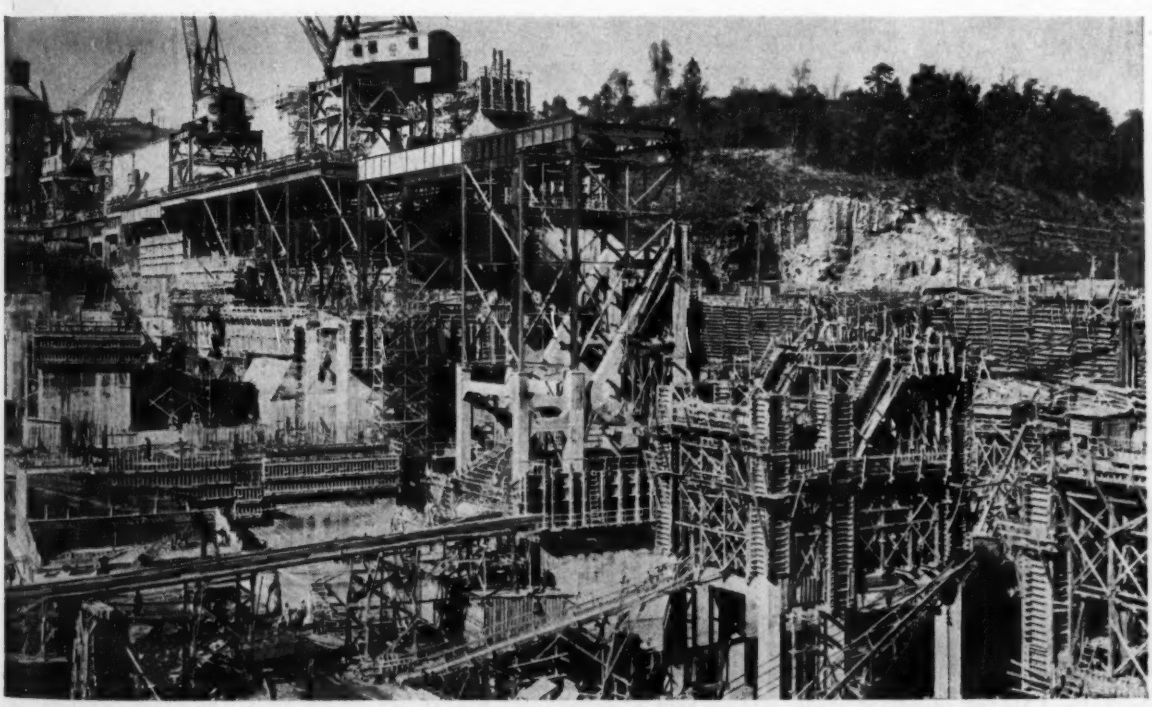


Fig. 5. Use of high concrete bents for trestle supports allowed a major saving of steel, but increased costs and erection time. Concrete plant may be seen at left and concrete placing by large crane and bucket above the trestle.

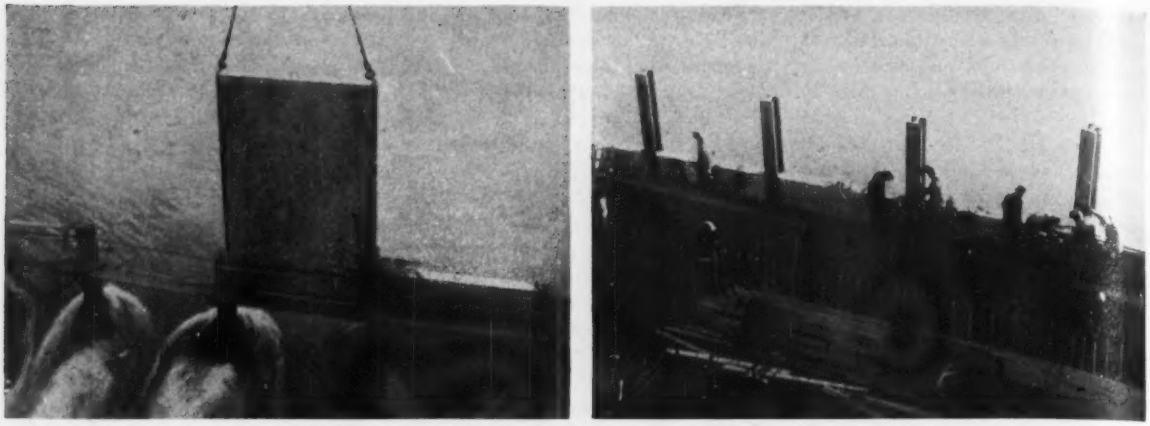


Fig. 6. Closure of Douglas Dam was done against a flow of 12,000 cfs. by dropping precast 12x18-ft. gates into previously embedded I-beam guides. Right, guides being placed for an added life of closure gates.

weighing 17 tons. The concrete gates were handled by gantry cranes on the construction bridge and were dropped into position within the steel beam guides as shown in Fig. 6. No seals were used and the small leakage was stopped by sifting cinders along the upstream side of the concrete gates.

To handle the flow of the river at the time closure was made, the eight permanent sluices in the spillway section of the dam were opened. The elevation of the section left low in the dam was the same as that at the bottom of the permanent sluices. Flow in the river at the time was 12,000 cfs., so that several feet of water was flowing rapidly through the closure area but this was stopped without difficulty.

Construction of Douglas Dam was done by TVA's own forces under T. B. Parker, chief engineer, A. L. Pauls, chief construction engineer for the authority, and L. G. Warren, project manager at Douglas.

J. S. Lewis was construction superintendent and R. C. Perkins assistant superintendent. Thomas F. Taylor served as construction engineer and J. W. Clarke, assistant construction engineer. Design work on the dam was handled by G. R. Rich, head design engineer of TVA and plant layout and design was supervised by R. T. Colburn, construction plant engineer.

Aggregates were produced by the Birmingham Slag Co. of Birmingham, Ala. Its plant at the site was operated by Jack Graham, superintendent.

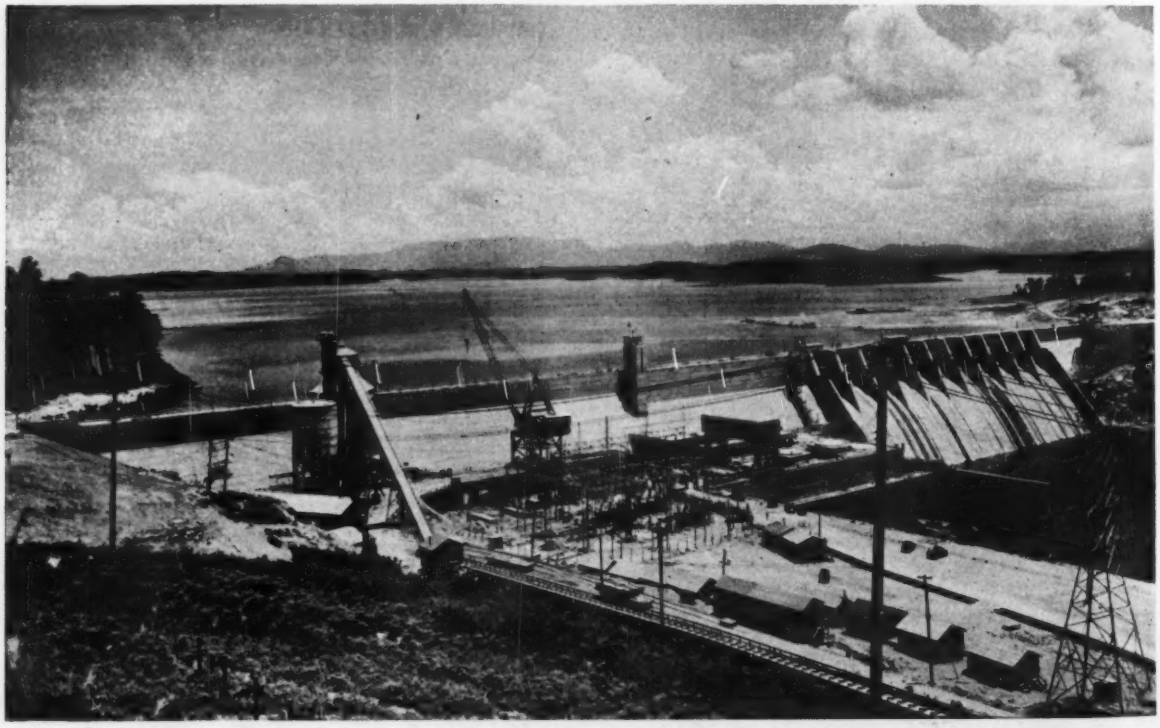


Fig. 7. The 1,260,000 acre-ft. of usable storage back of Douglas Dam will produce 100,000 kw. of continuous power during the low water season this fall. The stored water also can be used for power generation at seven dams downstream on the Tennessee River as well as through power units at Douglas Dam.

Timber Rigid Frames and Trussed Columns

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***Contents in Brief**—Timber bents in which the design provided for the utilization of relatively small members, have been used in several Navy shop buildings. Bowstring trusses were knee-braced to trussed columns in one type of bent. Another building incorporated bents of strictly rigid frame design, with the columns laced together in pairs to provide increased rigidity. A third arrangement adopted simple trusses supported on built-up columns, with all transverse loads resisted by latticed columns along one side only.*

Fig. 1. Bents composed of 100-ft. span bowstring trusses and 25-ft. columns were erected with a crawler-crane for five Navy shop buildings. Trussed columns resist transverse wind loads while truss reactions are delivered to the outer column-chords.

AN APPRECIABLE SAVING of timber was made in the recent construction of several large Navy shop buildings by designing the roof trusses and trussed columns for continuity and column restraint.

Conservation of steel was the primary consideration that led to the use of timber construction, but because long timbers of large sizes were difficult to obtain in sufficient quantities, designs were adopted in which timbers not larger than 4x8 in. were used for the trusses and bent framing. Ample restraint at the column bases was provided by massive concrete foundations.

Three separate types of buildings were constructed, each type being of different size and design as required for its individual function.

Standard designs were successfully developed for one group of five shop buildings measuring 100 by 250 ft., and about 25 ft. high from finished floor to bottom of truss. Bowstring roof trusses of 100-ft. span and having parabolic top chords were connected to trussed columns in such a way that the outer chord of the columns would take the entire vertical load while at the same time all transverse forces acting on the bents would be resisted by truss action of the columns. Inside column chords were braced horizontally by kneebraces to the girt system.

Bents, comprising a truss and two columns, were designed for dead, live and wind loads. Unreinforced concrete footings provided sufficient column restraint to place the point of contraflexure at a distance one-third the height from column base to bottom of kneebrace. Horizontal reactions were calculated by the approximate method of bent analysis (not rigid frame analysis) and stresses determined accordingly.

Upper chords of the trusses are glued-laminated construction using 1x4-in. timbers. Solid 4x6-in. members were originally specified for lower chords, but because of the difficulty in obtaining the required quality and quantity, glued-laminated members were used instead. No timbers larger than 4x6 in. were used in the bents of these buildings, although some girt framing was 6x10.

Design of fabricating shop

The functional requirements of some of the buildings demanded special framing, one of which was a fabricating shop 200 by 350 ft. by 30½ ft. to bottom of trusses, two bays wide and spanned by two 100-ft. Pratt roof trusses with sloping top chords. Trussed columns along one side of the building provide the entire resistance to cross wind since the opposite side is adjacent to another building of greater height. Other columns of the bents are built-up members using 3x14-in. timbers bolted together in contact.

Two 10-ton bridge cranes of 100-ft. span were provided in each bay, resting on crane runway girders of rolled steel sections supported by

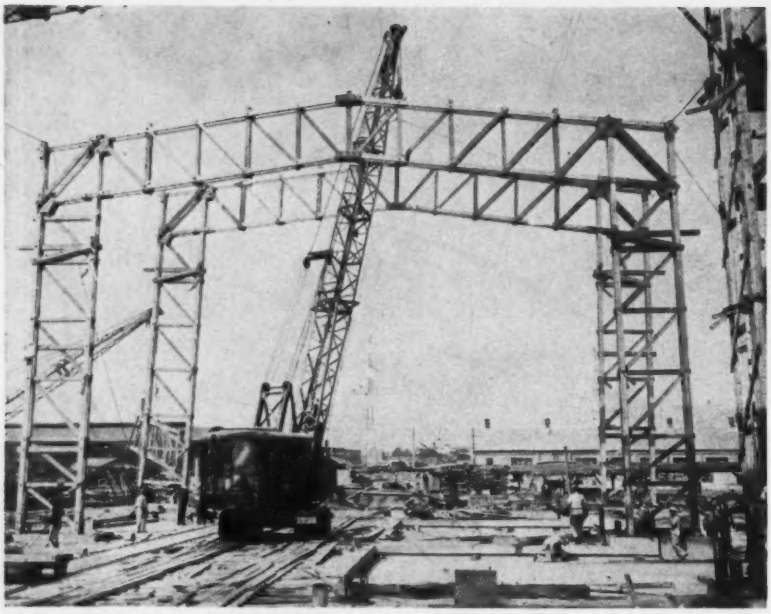


Fig. 2. Timber bents 79 ft. wide and 52 ft. high were designed as fixed-end rigid frames. Columns were laced together in pairs to provide lateral rigidity against buckling.

Fig. 3. Two-span bents 200 ft. long, 35 ft. high, were erected by three crawler-cranes operating simultaneously. The latticed column, shown in the bent under erection, was designed to resist all transverse wind load. Temporary stiffening timbers reduced erection stresses in columns.

timber columns. The use of timber girders for crane runways was deemed impracticable. Crane runway columns were made of built-up timbers and attached to the building columns with wood lattice bars and also braced longitudinally at the column struts with short kneebraces.

Another building requiring special arrangement of framing and an unusual design was a subassembly shop 79 by 550 ft. by 52 ft. high at the ridge. Two five-ton bridge cranes with runways supported on separate built-up 14x14-in. columns were provided, and doors 36 ft. wide by 30 ft. high were located in each bay along one side. Wide flange steel beams were necessary for crane runway girders and steel channels were employed to support the doors, but all other framing was of timber (Fig. 4).

Sufficient stiffness for the 30-ft. unbraced column height was provided by using latticed double bents 5 ft. wide, spaced 45-ft. c. to c. Transverse bents were designed as fixed-end rigid frames having a constant moment of inertia, and horizontal trusses were placed between towers to resist longitudinal wind load. Secondary roof trusses of 40-ft. clear span between bents support the tertiary beams and purlins.

The inside and outside chords of the bents are of glued-laminated construction in which the largest single timber used was a 4x8. Because of the height of the building, vertical members in the end wall framing were also made of trussed column construction.

Fabrication and erection

All bowstring trusses and columns for the standard shop buildings were prefabricated, the trusses being assembled on the job, while the trussed columns were received ready for erection. Bents were assembled on the ground and set into place by a crawler crane, using a two-point pick-up.

Trusses and columns for the fabricating shop were fabricated and assembled on the job by the general contractor. After the members were drilled and grooved for timber connectors, they were assembled for erection on the ground adjacent to the foundations, and the complete 200-ft. bent, including crane columns, was erected as one unit. Building columns were necessarily stiffened for erection. Three crawler-cranes working simultaneously erected each bent, using a six point pick-up.

Framing for the subassembly shop was prefabricated, the bents being received in four sections (two columns and two trusses). These were assembled on the ground adjacent to their footings and erected by a crawler-crane using a two-point pickup.

Bents were erected at a rate of six per day for the standard shop buildings, one per day for the fabricating shop and three per day for the subassembly shop. All timber used was yellow pine or Douglas fir, dense grade (1,600 F, 1,200 C, S4S). Timber connectors, split rings and shear plates were used throughout the main framing and in a portion of the secondary framing.

Since the majority of the buildings

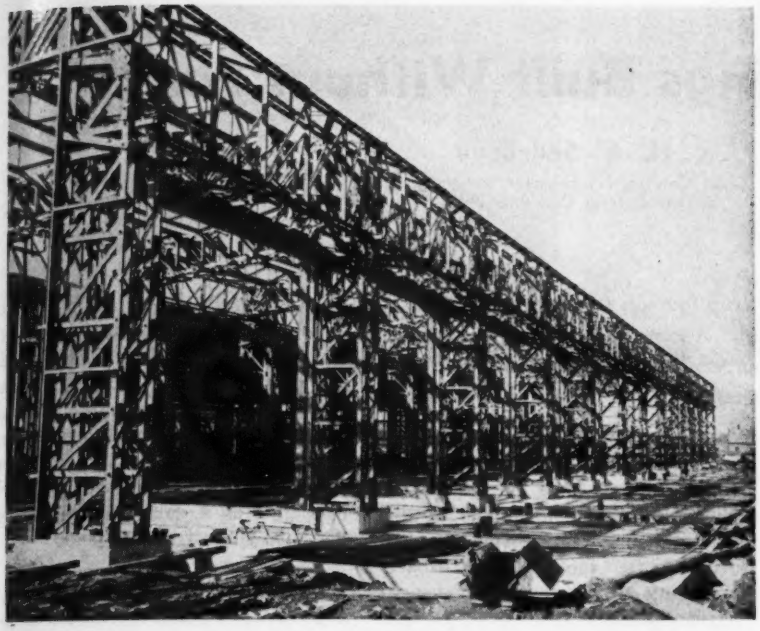


Fig. 4. Openings were provided along one side of the subassembly shop for 36-ft. wide by 30-ft. high doors. Steel runway girders for two 5-ton bridge cranes were supported on built-up timber columns. Steel channels were used to support the doors.

were located on semi-marsh land, foundations were supported on timber piles, some being battered for lateral stability. An existing firm top stratum of clay permitted most of the floor slabs to be placed directly on the ground. Cleavage joints were placed around the periphery of the floor slabs, and they were also reinforced with welded wire fabric.

All designs on this building program were executed by Navy civilian engineers and architects under the general supervision of an officer of the Civil Engineering Corps, U. S. Navy.

Asphaltic Pavement Bars Protect Safety Zones

Precast asphaltic concrete bars set in pavement surfaces to form ridges that will jolt the motorist who drives over them, have been installed at several points in California, notably in San Francisco and in Daly City, a suburban community, as a protection for safety zones located beside street railway tracks. Thus far, the installation is regarded as experimental; the bars have been placed at a 45-deg. angle and also at right angles to traffic. The common name is "bump bars" or chatter bars."

Realizing that it would be impracticable to maintain temporary barricades on busy San Francisco streets to protect bars made of hot mix, it was decided to precast the bars at the city's asphalt plant. Accordingly, a V-shaped form was made in which the bars can be cast upside down and well-tamped. After thorough tamping the bars are smoothed with a hot iron and spikes are inserted at intervals, depending on the length of the bar, to make holes that can be used for spiking the bar in place on the street. When sufficiently cooled, the bars are inverted and placed on a 2x8-in. plank on which they are stored until delivered to the street. Meantime they are given a cement wash in order to fill any voids and prevent absorption of the white paint that is to go on later. They weigh about 55 lb. each.

Photo: Calif. Highways & Public Works Magazine

"Bump bars" for safety zone protection.

The crew that delivers the bars consists of one truck driver and two laborers who place the planks, with the bars upon them, near the safety zone to be protected. This truck and crew, used only for delivering the bars, is followed by a five-man crew of asphalt workers who prepare the base by levelling where necessary and painting the street area and the bottoms of the bars with a coat of hot liquid asphalt. It is important that both areas be well painted right to the edge of the bars in order to prevent ravelling. Bars are then spiked down as additional precaution against movement. Smoothing irons are used around the base to make a smooth, neat job. The bars are then given two coats of white lacquer and this paint is renewed whenever traffic lines and zones are repainted. The estimated cost of a single bar is somewhat less than $1.

The first design called for bars set at 45 deg., ten to each zone. This number was soon reduced, however, and a zone now contains five bars set at right angles to traffic, the lengths varying from 2 ft. to 4 ft. 4 in. The area occupied by the bars was moved 10 ft. back of the original safety zone to prevent people from stumbling in boarding or leaving street cars. The entire length of the bar zone is about 25 ft.

Suggestion of this design, as applied in San Francisco, is credited to R. A. Klassen, city engineer of Daly City. He has used in his community a somewhat different plan in that asphalt goes to the streets while hot and is there molded in place. The California Division of Highways has made some application of the idea and in San Francisco George Purser, assistant city engineer, developed details of the precast method described.

After five months of service the bars show no ravelling or cracking, however a new design of concrete bars surfaced with white cement is being considered.

Deep Footings Built Without Forms

H. A. Saurbrey
Chief Construction Engineer, Westinghouse Electric & Mfg. Co., Pittsburgh, Pa.

***Contents in Brief**—Several hundred deep footings for a factory were constructed in firm clay without formwork. A clamshell bucket removed the earth, but workmen guided by a timber template shaped the sidewalls with hand spades. Reinforcing steel was then set and concrete was placed directly against the clay at a large saving in cost.*

UNUSUAL SOIL CONDITIONS at the site of a new factory for the Westinghouse Electric & Manufacturing Co. made it possible to save the entire cost of formwork for several hundred concrete footings. The soil was a fine dense clay that could be carved almost like cheese and of a type that would stand up for a long time without support. The advantage of this characteristic was utilized in constructing the footings, the excavation being carried down with straight vertical sides.

The site of over 100 acres on which the buildings were to be constructed was practically level. About 10 ft. below the surface a continuous stratum of hard shale was encountered, which formed an excellent foundation support. The footings were carried down to this hard shale, the excavations penetrating some 3 in. of softer shale. Position of the latter appears in Fig. 1 as a dark line separating the hard shale from the clay.

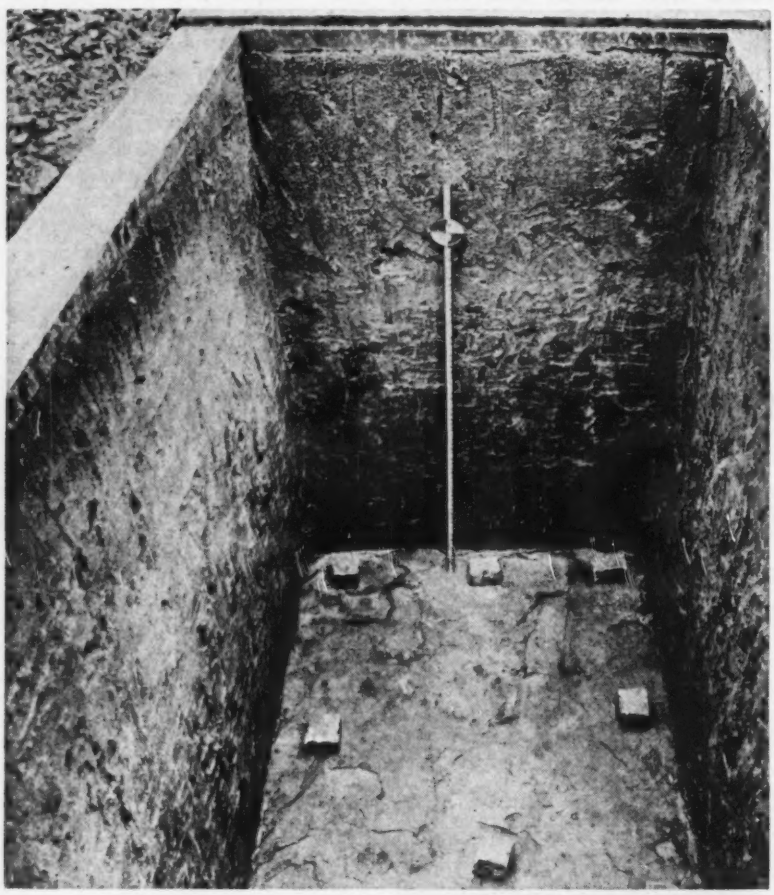


Fig. 1. Guided by a timber template, workmen cut the walls of this deep excavation with hand spades and threw the material to the center for removal by a clamshell bucket. The small rocks lying on the exposed shale were placed there to support the reinforcing steel.

Template guides excavation

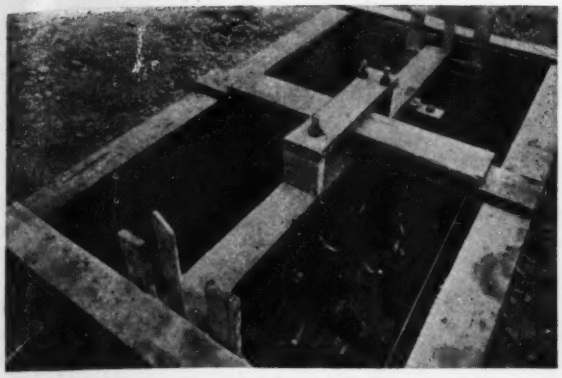
In order to guide the workmen doing the earth work and to keep the top of the excavation from fraying, a simple template composed of 3x12-in. timbers was laid on the surface of the ground as shown by Fig. 1. This template also formed the foundation for the supports for the anchor bolts. After the bolts had been suspended from a framework as shown in Fig. 2, the concrete footing was poured by the simple expediency of filling the entire hole with concrete.

The factory comprises several groups of buildings erected at different times. On the first group some 600 footings were constructed in the manner described without any appreciable loss of earth from the exposed banks of the excavation. It is estimated that the total loss, which was caused mostly by alternate freezing and thawing of the exposed top soil, was not more than 10 or 15 cu.yd. of clay. The small amounts of "caved" material were carefully removed before concreting started. The appearance of the shaft in Fig. 1 is typical of all excavations.

Intermediate braces

During construction of additions to the same plant there were encountered somewhat less favorable soil conditions, which, however, were overcome easily by the introduction of an intermediate set of braces half way down the excavated hole.

The excavation method illustrated was carried out substantially as shown for about 900 footings and the estimated saving in the formwork



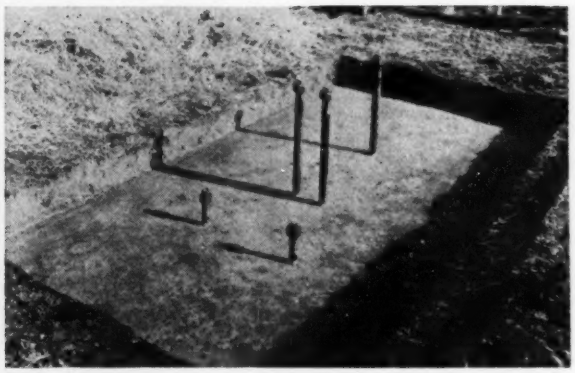


Fig. 2. Anchor bolts were supported by a timber framework moved from hole to hole as work advanced. Right, a completed footing after the template and the framework for supporting the anchor bolts had been removed.

was in excess of $60,000. To this figure must be added the saving obtained by dispensing with all backfill. The excavation was made partly by hand and partly with a clamshell bucket. Workmen with ordinary hand spades cut the outside perimeter of the holes straight and square. They threw the loosened clay to the middle of the hole, where it was removed, together with the bulk of the excavation, with a clamshell bucket.

Bids received on this type of excavation varied somewhat and with the first operation the work cost 99c. per cu. yd. On subsequent additions the price was higher, the low bidder quoting $1.65 per cu.yd. for this type of excavation. These prices are based upon the use of union labor throughout.

A close inspection of the exposed bank in Fig. 1 shows a number of round holes and a few pockets, which are the work of the crawfish that abound in the territory. These little crustaceans are of the size and appearance of the crawfish commonly found in our streams, but they live in a fairly dry soil in burrows. During heavy rainfall, the chamber at the bottom of the shaft fills with water and serves the crawfish with a moist chamber in which to live. No particular difficulties were encountered because of the animals, except the workmen sometimes received an unexpected shower bath when the walls of the little water chamber burst.

George Parkman is director of the building construction and maintenance department of Westinghouse Electric & Manufacturing Co. The design and construction was done under the direct supervision of the writer as chief construction engineer; Henry J. Larsen was principal assistant.

Michigan Communities in Joint Agreement To Solve Sewage Disposal Problem

A joint agreement involving cooperative action by 13 communities and the state is expected to solve a serious sanitation problem in the Detroit area, according to the American Public Works Association. The problem involved the emptying of untreated sewage by the communities, in Oakland County just north of Detroit, into a creek which in turn polluted the Clinton River and some parts of Lake St. Clair.

The situation was brought to a head, after 17 years of negotiating under adverse conditions with regard to state laws, when the state health department ordered several of the communities to stop dumping untreated sewage into the creek and, about a year ago, the Federal Housing Authority refused to insure any more mortgages for residential buildings in the area except in the region served by Royal Oak disposal plant.

Eight cities, one village, three townships and one county—Oakland County—and the state are the governmental units entering into the agreement.

As a result of the joint agreement, work has been started on a 5.5-ft. tunnel intercepting the sewer systems of the various communities and on a pumping station to lift the sewage to a gravity-flow section intercepting the tunnel. By means of diversion chambers, storm water will continue to be discharged into the creek while the sanitary sewage will be carried through the tunnel into the Detroit sewer system, which will carry it to the city's disposal plant for treatment.

Of the total cost of $1,567,000, the Federal Works Agency will provide $662,000, with the balance financed by the sponsors through issuance of 30-year revenue bonds which will be retired from sewer service charges based on water consumption of the communities. Cost of the project includes $137,000 to be paid the city of Detroit as a proportionate share of the capital cost of the Detroit sewers utilized to carry the sewage from the southern part of Oakland County to the point where it enters the intercepting sewer of the Detroit sewage disposal system.

Annual service charge to owners of small homes using 5,000 cu. ft. of water a year will be approximately $5; to medium sized homes, about $7.20. The actual charge will be based on meter readings and must produce sufficient revenue to meet annual maintenance, operating and debt service charges.

Oakland County, through the office of county drain commissioner, will administer all phases of the project including maintenance and operation of facilities when completed, as provided in written agreements between the county and each of the cities involved. The county has the right to terminate sewage disposal service to any community that is 90 days delinquent in payment of service charges.

Job-made Tackle Lifts Heavy Trusses

John D. Watson
Project Manager, J. A. Jones Construction Co.,
Charlotte, N. C.

***Contents in Brief**—Using job-made capstans and four 55-ft. timber gin poles, it was possible to raise into position 22-ton timber trusses for an airplane hangar. The trusses were prefabricated at a central yard, each piece clearly marked and delivered to the site knocked-down. A crew of 20 carpenters and 30 laborers re-assembled and raised one truss during each 10 hr. shift. Actual raising operations required only 30 min.*

JOB-MADE CAPSTANS and timber gin poles, primitive tools by modern standards, were used successfully to raise the heavy timber trusses for an airplane hangar at an army project.

Because long boom cranes were not available, and since only one hangar was required on the job, the original plan was to use gin poles and hand-crank winches or crabs. But no calculations were made of the weight involved or the power required, and as a result the attempt to raise the first truss, an interior one, showed the crabs to have insufficient power. The rigging of multiple blocks also was impossible, because the drums on the crabs were too small to hold all the cable required.

The rigging foreman, an old lumberman, then suggested the use of timber capstans, a device that proved highly satisfactory. As a result, another war project was completed on schedule and below the original cost estimates.

The building is composed of 16 bays all 16 ft. wide. The two end trusses each weigh about 22 tons; these members are considerably heavier than the interior trusses because they carry steel guide angles for the wooden doors of the hangar. The clear span of the trusses is 120 ft., and at either side timber bents for a 20-ft. wide lean-to are framed into the columns supporting the trusses. The height of the opening from the floor to the bottom chord of the trusses is 30 ft., and the center height of the trusses is 15 ft., making the total height to the peak of the trusses 45 ft.

Four 55-ft. long gin poles were used on the truss and two 35 ft. gin poles on the lean-to roof beams. To the bottom of each large pole was

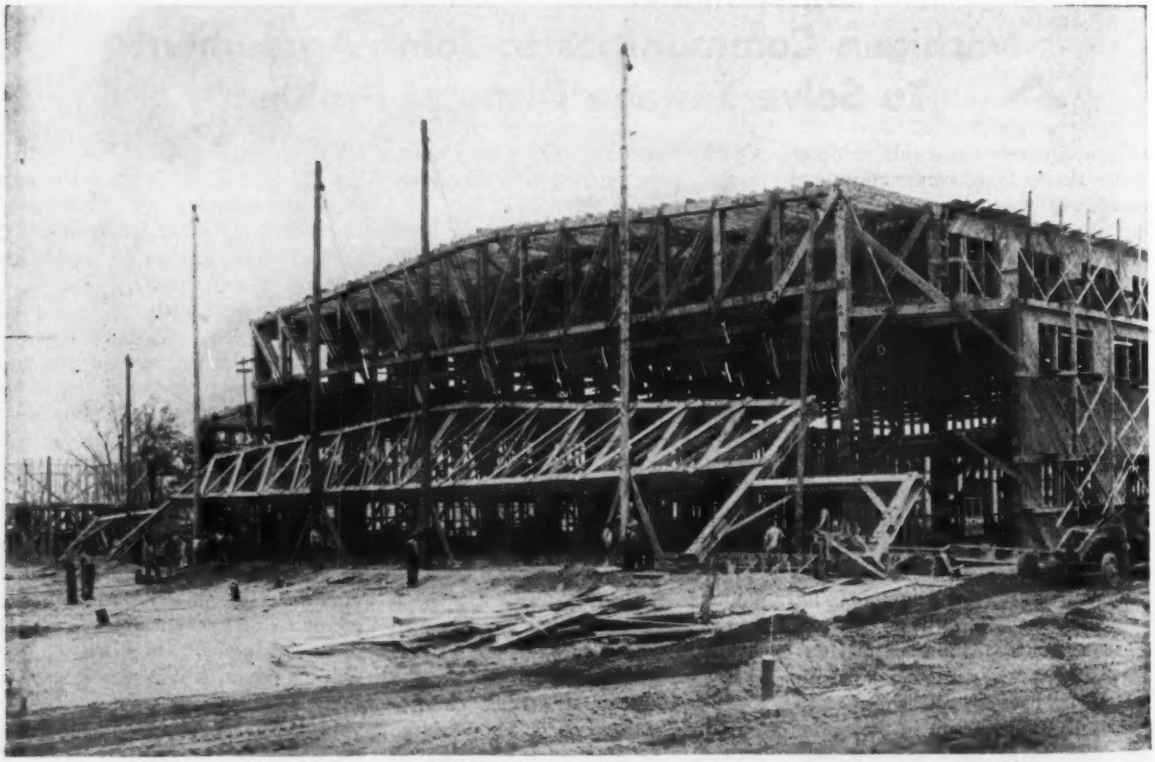


Fig. 1. Timber trusses of 120-ft. span with lean-to framing attached at either side are erected with six gin poles, power being supplied by two job-made capstans and hand winches operated by small crews of workmen.

framed a triangular base, which was of great value in steadying the poles when moving them ahead while in a vertical position. The two front guys on each pole were rope, the back guys ⅝-in. cable, and the hoisting lines ¾-in. dia. cable. Double blocks were attached to the top of each pole, and single blocks were connected to the slings on the truss.

When the attempt to purchase capstans proved unsuccessful, the carpenter crews made two capstans on the job. An 18-in. dia. elm tree, cut on the site, was used for the drums, and the frames were made with timbers rejected for use in the permanent structure. The capstans were used on the two center poles only, a small crew of workmen operating hand winches at the other poles. To the base of each of the two center poles a single snatch block was fastened to transfer the hoisting cable from a vertical to a horizontal plane.

The timbers for the trusses were cut at the central carpenter yard where all the buildings had been fabricated, and the trusses assembled on a nearby work bench. Next each piece was marked, the truss knocked down, and hauled to the building site. There a crew of 20 carpenters and 30 laborers re-assembled, and raised one truss during each 10-hr. shift; the lean-to roof beams and knee braces were fabricated and raised with the trusses. The actual raising operation required only 30 minutes.

After a truss was raised to the full height, the slings on the lean-to roof beams were loosened, letting the lean-to framing hang as cantilevers. Next the small gin poles were used to raise the column bents. While the truss was being bolted to the bents, guy ropes were attached to hold the truss, so that the gin poles could be moved ahead as soon as load was slacked off.

The capstans were anchored against cross ties set vertically in the ground and a sufficient length of hoisting cable was available to have permitted setting of the capstans only twice. However, with the final plan the capstans were set three times, as materials for the heavy exterior trusses were not available when the interior trusses were ready.

Erection procedure was as follows: The first truss raised was the most western interior truss, and after this member was in place the raising operation proceeded from west to east, requiring two settings of the capstans. After the exterior truss on the east end of the building had been erected, all the gin poles were taken down, carried to the west end of the building, and raised again for erecting the west exterior truss as the last operation.

The project was carried out under the direction of Lt. Col. John C. Wade, area engineer for the U. S. Engineers. Charles T. Main, Inc., of Boston, Mass., was the architect-engineer. The author was project manager for the general contractors.

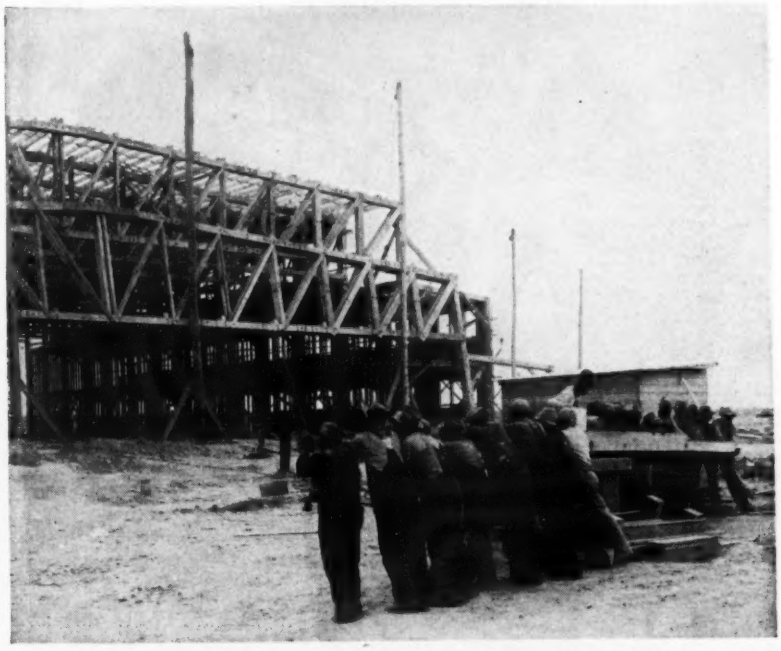


Fig. 2. Workmen operating job-made capstan to supply lifting power for one of two 55-ft. center gin poles. Normally, a smaller crew of workmen was used, especially with the lighter interior trusses.

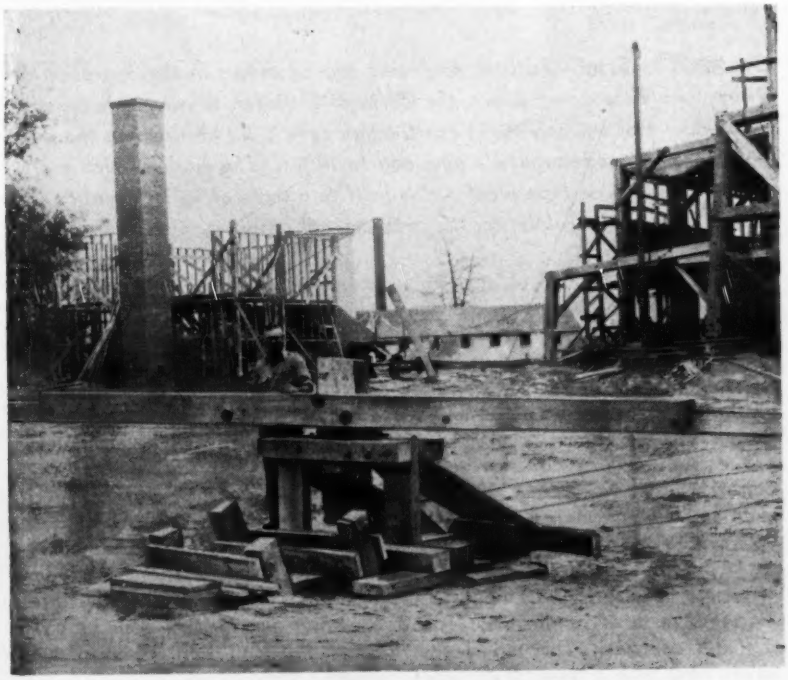
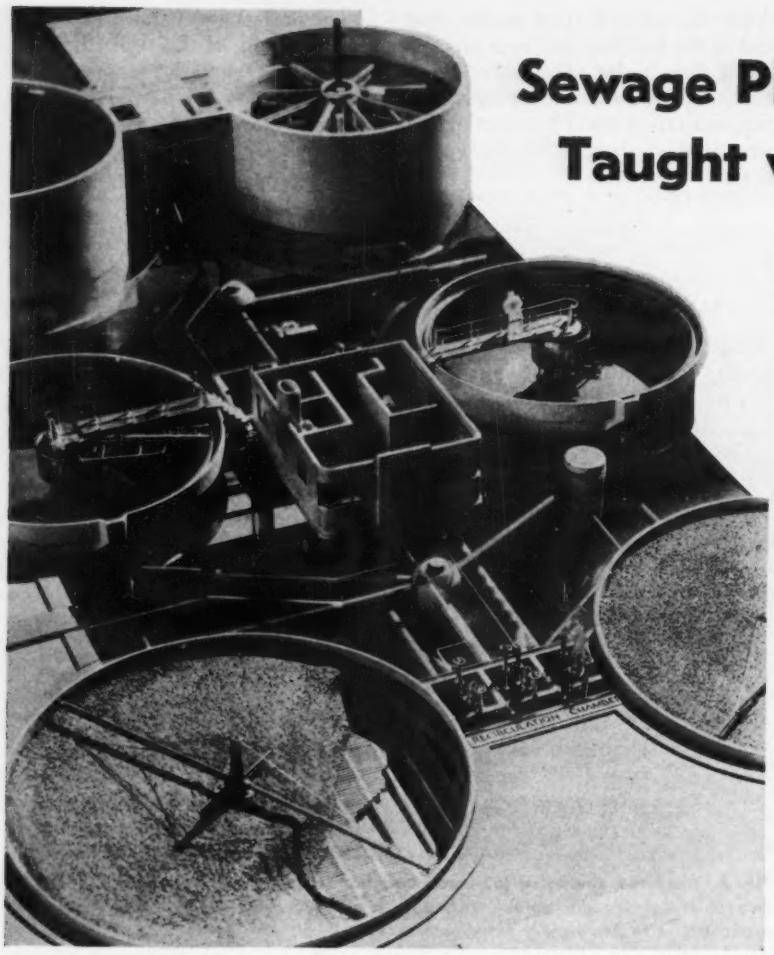


Fig. 3. Capstan drum was cut from an 18-in. dia. elm tree and the frame was made from timber unsuitable for fabrication of the trusses.

Sewage Plant Operation Taught with a Model



U. S. Army Signal Corps Photos

***Contents in Brief**—To train engineers and operators in the operation of Army sewage treatment plants, the Corps of Engineers is using a demonstration model that not only shows construction details but also reveals the relationship of all underground piping and facilities. The model, which represents a biofiltration type plant and is built to a scale of 1/4 in. equal to one foot, is particularly helpful for men who are not expert in reading plans.*

A UNIQUE SCALE MODEL of an Army sewage treatment plant, which shows cut-away sections of various units as well as underground piping, galleries and pumping facilities, is being used by the Corps of Engineers as an effective teaching aid.

The model is a precise representation of a biofiltration type treatment plant built to a scale of ¼ in. equal to 1 ft. The original plan was to construct the top and sides of the model of sheets of clear plastic, but war shortages made it impossible to obtain this material. The model was finally built with a transparent panel in the ground surface through which the major portion of the underground piping could be viewed, and the use of glass sides allow further inspection of the underground facilities.

Inspiration for the model, which was designed for demonstration purposes only, was brought about because of some difficulties encountered in teaching sewage plant operation. These difficulties arose because men, in visiting plants, could see only the surface structures and were unable to grasp the complexities of underground piping and gallery facilities. This was particularly true in cases where the men were not expert in reading plans.

The model is widely used for demonstrations at: (1) short courses for supervisors of sanitary engineering utilities; (2) courses being given by various state organizations, in which Army plant operators participate; and (3) post engineer schools conducted by the service commands.

The sewage treatment plant illustrated by the model employs the two-stage biofiltration process with provision for single-stage operation if necessary. Sludge disposal is accomplished by a two-stage digestion system followed by conventional sludge drying beds. The plant design conforms to the standard requirements for a permanent post yielding the following design data:

Design population	5,500
Sewage flow per capita	100 gal.
Total sewage flow per day	550,000 gal.
B. O. D. load per day	1,100 lb.
Suspended solids per day	1,490 lb.

The plant consists of grit chambers, parshall flume, a mechanically cleaned bar screen, raw sewage pumps, identical primary and secondary clarifiers, primary and secondary biofilters, recirculation pumps, a two-stage digestion system with a heated primary tank and a floating cover on the secondary tank, and sludge drying beds.

Features of the model

In the model, the piping color scheme has been arranged to carry the eye through the flow diagram in the successive steps of purification. For example, the color of the raw sewage appears in the grit chambers, flume, screen, pumps and in the inlet to the primary clarifiers. In the primary clarifier the first major purification step takes place and the color changes to the color used in the launders for the primary clarifier effluent.

Where flows from two units are mixed this is shown by pipes striped with the corresponding colors. Pipes not being used in the method of operation for which the model is set-up are shown in white. Closed valves are painted black and open valves have the color of the lines they occur in. The complete color scheme is given

in the key-chart placed on the model.

As shown by the model, this plant is being operated as a two-stage biofilter installation. Raw sewage enters the plant through the grit chambers. Dual units are provided with one unit out of service for manual cleaning. The parshall flume which follows the grit chambers, serves as a flow controller and maintains a constant depth of flow in the grit chambers, as well as providing the primary metering element for the recorder which is located in the control house.

As sewage enters the sumps below the operating deck at the control house, it passes through a mechanically cleaned bar screen. Following this it enters the raw sewage sump nearest the primary clarifier. The two submerged vertical pumps force the raw sewage into the small chamber under the steps to the primary clarifier bridge against a small positive head. Here the raw sewage mixes with the recirculated primary biofilter effluent and the mixture is then forced to the primary clarifier. A stand-by raw sewage pump is located in the other large sump under the operating deck.

Operation of clarifier

The flow entering the primary clarifier discharges up through the center column and flows out underneath the circular baffle. The flow through the clarifier is radial and is taken off through a circular weir and then flows through a circular launder to the pipe leading to the primary biofilter. The solids deposited in the clarifier are collected by the circular sludge collector mechanism and concentrated or swept to the sludge sump near the center column.

Sludge is drawn by gravity to the sludge sump underneath the operating deck as frequently as is necessary to keep the clarifier free of heavy sludge deposits. The floating material is picked up by the skimming mechanism and carried to the collecting trough from which it flows by gravity to the sludge sump just mentioned.

The flow from the primary clarifier enters the primary biofilter through the center column and flows outward into the arms of the rotary distributor. The reaction of the jets coming from these arms provides the sole power needed for rotating the mechanism. The rotating action provides an even, high rate of distribution of the sewage over the filter stone. As the sewage passes down through the rock, the dissolved organic material is partially oxidized to more stable compounds.

The sewage is collected in the channels of the underdrain system and conducted to the main channel which carries the flow out of the filter and into the recirculation pump sumps. The major portion of the flow enters the second sump where the propeller type pump picks it up and forces it back to the junction chamber. Here it mixes with the raw sewage and passes through the primary clarifier and biofilter circuit a second time. A portion of the flow is continuously circulated through this primary circuit.

The balance of the effluent from the primary filter passes over a control sill which is adjusted to divide the flow in any desired proportions. The flow going over this control sill enters the third recirculation pump sump along with the effluent from the secondary biofilter. Three recirculation pumps are provided to allow for flexibility and a stand-by unit.

The mixed flow of the biofilter effluents is pumped to the small chamber under the operating deck nearest the secondary clarifier. From here it flows to the center column of the secondary clarifier. This is identical in design and operation with the primary clarifier except that it contains no skimming mechanism. The effluent from this unit flows to the secondary biofilter, which is also identical with the primary unit. The secondary biofilter effluent is all returned to the secondary clarifier.

The plant effluent is taken off at the secondary clarifier outlet through a butterfly type of valve. This valve is controlled, through a float, by the liquid level in the sump receiving the

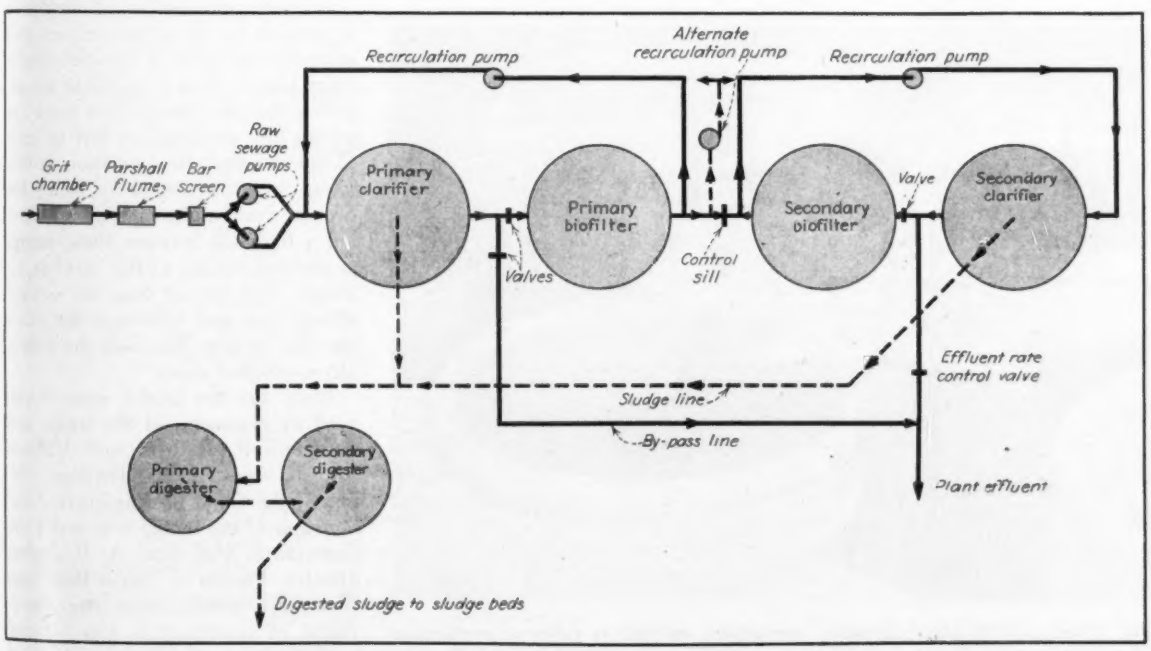


Fig. 1. Flow diagram of the sewage treatment plant model, which illustrates operation of the biofiltration process.

mixed biofilter effluents. In this way the valve is opened just enough to maintain constant hydraulic conditions throughout the plant under varying sewage flows. The effluent flows to a junction manhole near the recirculation pumps and then out to the water body, which is the final method of disposal of the liquid portion of the wastes.

Sludge handling facilities

Raw sludge from the clarifiers and the scum from the primary clarifier is pumped from the sludge sump by a plunger type pump to the two-stage digestion system. The sludge enters the fixed cover primary digester. In order to maintain the required liquid level in the primary digester an equivalent amount of supernatant liquor is drawn off during sludge pumping and transferred to the secondary digester. Sampling cocks at several levels permit choosing the supernatant draw-off, which draws the liquor from the level having the lowest solids concentration. Sludge is pumped to the digesters on the same schedule as that for drawing of sludge from the clarifiers.

Continuous operation of the sludge mixing equipment will keep the sludge and supernatant in the primary digester quite well mixed. Partially digested sludge is displaced to the secondary digester during pumping of the raw sludge to the primary digester. If the sludge mixer is not operated, thick partially digested sludge or supernatant from any chosen drawoff may be transferred while adding the raw sludge.

The floating cover of the secondary digester permits additions of partially digested sludge or supernatant to be made for sometime without withdrawing any of the contents of the floating cover digester. When so desired, or when the cover is raised to its upper limit, supernatant may be withdrawn by gravity and returned to the raw sewage pump sump.

Completely digested sludge is also drawn from the secondary digester and flows by gravity to the sludge drying beds. Here it is air-dryed and finally disposed of as fertilizer or fill. The frequency of drawing digested sludge depends on the rate of accumulations in the secondary digester.

Provision is made for pumping raw sludge to the secondary digester if necessary. Supernatant liquor may be returned from the primary digester to the raw sewage pump sump, if necessary.

The chlorinator located in the control house is arranged to permit application of chlorine to the junction manhole on the effluent line for sterilization purposes, or to the plant effluent for odor control.

The flexibility in the piping layout permits various combinations of the units or by-passing of various units of the plant. It is possible to by-pass all of the secondary units of the plant by closing the valve in the line from the primary clarifier to the primary biofilter. The valve on the by-pass line, which is the white pipe running to the junction manhole on the effluent line, is then opened to send the flow through this line.

All of the plant except the secondary clarifier may also be by-passed. To accomplish this, all of the raw sewage is diverted from the pumps into the secondary clarifier by pumping into the junction chamber at the secondary unit. Closing the valve on the line from this unit to the secondary biofilter will send all the flow out through the effluent line and valve. The butterfly valve must be operated manually to permit this.

Operation may be varied

Portions of the plant may be utilized for operation as a single-stage biofilter. One scheme for such operation involves the by-passing of the secondary biofilter only. By this method a single-stage biofilter plant using primary and secondary clarifiers is obtained. Manual operation of the effluent butterfly valve is necessary in this type of operation. All recirculated flow passes through the primary clarifier. The flow to the secondary clarifier may be controlled by the use of control sills between the first and second recirculation pump sumps or by using the middle pump and dividing the flow by regulating the pump discharge valves.

An alternate scheme of operation is possible by using the primary and secondary circuits as parallel single-stage plants. This is possible by dividing the raw sewage flow from the pumps and sending one half to each of the clarifiers. Recirculation in this set-up is accomplished by using the two end recirculation pumps and having a high sill between these sumps to prevent mixing of the biofilter effluents. One circuit uses the normal effluent line and valve and the other uses the by-pass line with the manually controlled valve.

Plans for the model were developed by engineers of the water and sewage unit, Repairs and Utilities Branch, Construction Division, Office of the Chief of Engineers. Construction of the model was under the direction of Maj. Gen. A. D. Surles, director, Bureau of Public Relations, War Department; immediate supervision of construction was handled by S. G. Sowers, executive division of the exhibits section.

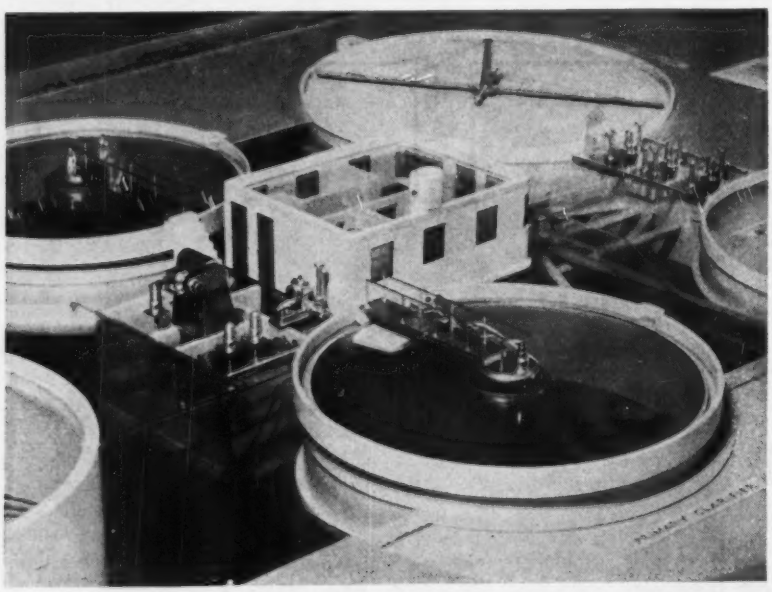


Fig. 2. Transparent glass partitions and covers, as well as cutaway sections on the plant model, provide opportunity to study construction details, including the underground piping, pumps, galleries and other facilities.

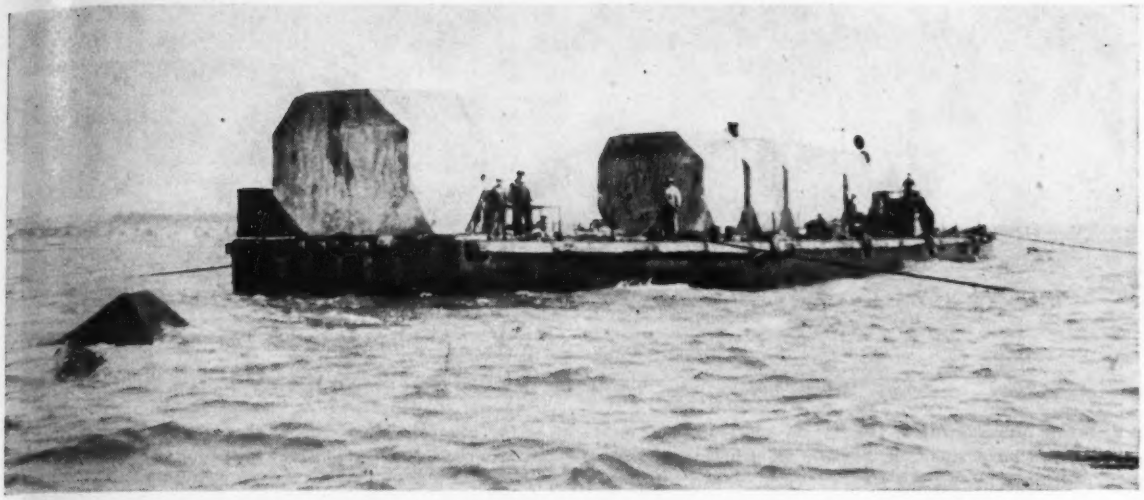


Fig. 1. Concrete blocks weighing 90 tons each were placed by special barge in a Portuguese breakwater.

Barge Places 90-Ton Breakwater Blocks

C. H. Cruttwell
New York, N. Y.

***Contents in Brief**—A special barge to transport and place 90-ton concrete blocks was designed for the construction of a 3,300-ft. breakwater in Portugal. A tipping car, operating on rails set below deck level, employed a system of screw jacks to dump the blocks over the end of an overhanging beam and into position in the breakwater.*

A DUMPING BARGE of unusual design and construction was used to transport and place 90-ton concrete blocks in a breakwater recently completed at the port of Leixoes, Portugal. The job involved extending an existing breakwater about 3,300 ft., of which the first 1,300 ft. was a coursed wall built of heavy rectangular concrete blocks, while the remaining 2,000 ft., subject to considerable wave action, was a submerged-mound type of granite rubble base capped by the 90-ton concrete blocks. It was for construction of this outer end of the breakwater that the special barge was required.

The special feature of the barge, which was 141 ft. long overall, with a 32-ft. overhang at the bow, permitting a close approach to the breakwater when dumping the blocks. Designed as a heavy beam, the central portion of the barge supported a track of two pairs of railroad rails carrying a tipping car, as shown in Fig. 3. This beam and track arrangement was at the bottom of a trough extending nearly the full length of the hull.

A seven-ton steam-powered winch in the stern of the barge propelled the tipping car through four 1¼-in. steel cables. Two water-ballast tanks, placed aft, could be filled or emptied as required to control the inclination of the deck under different loadings, thus preventing excessive stress on the towing winch. However, it was found unnecessary to use these ballast tanks during operations. A steam-driven winch was also mounted on each side of the deck, with suitable fairleads and bollards, to maneuver the barge into proper position for dumping. Stout timber fendering was provided all around the hull to prevent damage to the craft while lying alongside the loading quay.

Supported on four pairs of double-flanged wheels, the tipping car operated on the track in the central trough. Four motor-operated screw jacks, 25-ton capacity each, were mounted on the car chassis and arranged so they could be operated independently, in pairs or all four together, as required. Mounted in the bow of the barge were five cast steel rollers over which the concrete blocks were tipped.

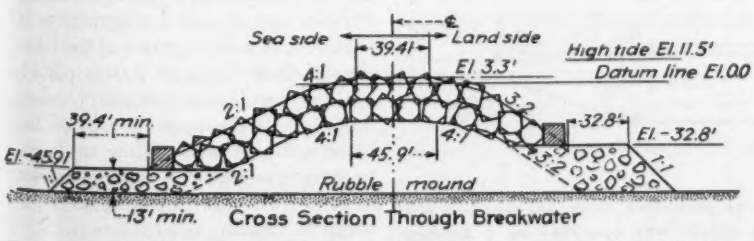


Fig. 2. Concrete blocks were dumped at random on top of a rubble mound between two rows of accurately located blocks, one at the toe of each slope.

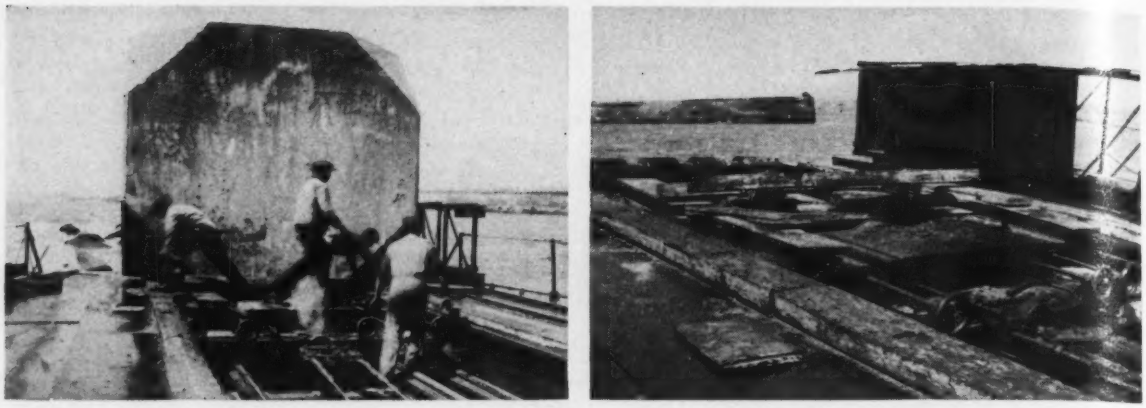


Fig. 3. Screw jacks on top of the tipping car (shown at left) raised the concrete block free of the deck for transporting it to the bow to be dumped. A movable steel bridge, shown at right, was run out over the breakwater for checking locations of dumped blocks.

The 90-ton cubical concrete blocks were loaded in line along the center of the barge, resting on hardwood battens bolted longitudinally along each side of the trough. Seven blocks, 12 ft. 3½ in. x 10 ft. 8 in. x 10 ft. 10 in., constituted a barge load. The blocks had a 3-ft. triangular chamfer at each corner to permit as much compaction as possible in the finished breakwater. Four lewis holes were formed in each block for crane loading hooks.

After loading, the barge was towed to the breakwater site and made fast to six buoys by 7-in. coir rope cables. Two buoys were placed on each side about 350 ft. from the axis of the breakwater to provide lateral movement of the barge. One buoy was placed forward and one aft for maneuvering the barge toward or away from the work. Dumping was across the section of breakwater, with the barge in a head-on position. Wire rope cable was used for the head mooring.

Placing concrete blocks

When the barge had been securely moored in proper position the tipping car was pulled underneath the concrete block nearest the bow. This block was then jacked up on the car to clear its supporting timbers and the car pulled forward until the front edge of the block hung over the cast steel rollers. The jacks were then lowered, until the block again rested on the hardwood timbers, and the car was moved back so the two front jacks only were under the rear edge of the block. These two jacks were then raised about three inches and wedge-shaped timbers, connected to drawbars, were placed across the rear of the concrete block to hold it securely in position.

With the block resting in this position (front edge on the steel rollers and rear edge supported by jacks on the tipping car), it was ready for dumping. Following a final check on the correct position of the barge, the car was hauled forward causing the block to roll over the bow rollers and, once the center of gravity had passed the equilibrium point, the block tipped over.

The head mooring rope was immediately paid out as a block was unloaded, otherwise the resulting backward surge might damage the rope. An average of seven minutes completed dumping operations of one block. Three trips of the barge were usually made per day, representing the disposal of 21 blocks, equivalent to about 1,100 cu.yd. of blockwork.

Settlement of blocks recorded

In order to prevent the blocks rolling down the rubble slope and getting out of section, a line of blocks was placed along both the inner and outer toes before any dumping was done on the rubble mound. A comprehensive surveying system was established, with base points on nearby breakwaters, for determining the position in which dumping was required, to keep a record of the location of each block as it was placed.

Great care was necessary when dumping in the upper levels of the breakwater, or when filling up holes, to insure a sufficient depth of water to form a cushion; a minimum depth of 10 ft. usually being allowed.

For the purpose of examining conditions existing under water, a light

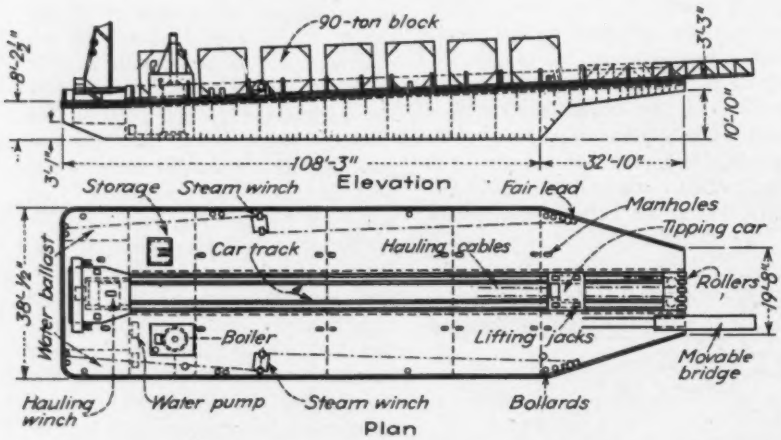


Fig. 4. Overhanging bow of the dumping barge permitted close approach to the breakwater. The tipping car for unloading blocks was operated by a hauling winch at the stern, while steam winches on deck maneuvered the barge into proper position.

steel bridge which could be run out about 12 ft. over the breakwater was mounted on one side of the bow of the barge.

Bad weather limited the working season for breakwater construction at Leixoes to about six months a year. At the end of each season's dumping, observations were taken on as many blocks as possible, and these were repeated before resuming operations. The surveys were made with theodolites placed at fixed points on the existing breakwaters. Relatively little displacement, and fairly small settlement of the deposited concrete blocks occurred during the winter weather, the average settlement rarely exceeding one foot.

A datum line for locating the top of breakwater was established 11½ ft. below high tide, and although the top of mound was intended to be placed about 3 ft. 3 in. above datum, in actual practice it was carried up to about high tide level.

Adoption of the submerged, mound-type breakwater at Leixoes resulted from experiments made on models of various type sections for the Portuguese government in the wave-propagation tank at the School of Engineering, University of Lausanne, Switzerland.

The construction contract was held by the Anglo Dutch Engineering & Harbour Works Co., Ltd., Matosinhos, Portugal, the writer being engineer in charge. The dumping barge was designed by the chief engineer of the Port of Leixoes in conjunction with the contractor's engineers.

Truss Revision Adds Mezzanine Space

Jacob Feld
Consulting Engineer, New York, N. Y.

Expansion of business in a non-war but still essential industrial plant (diaper service laundry) required added floor space with little chance of getting the necessary construction materials. The plant occupied a one story structure with a roof support made of three spans of wood trusses reclaimed from an army camp used in World War I. Analysis showed the possibility of securing additional floor space by moving the offices into a mezzanine space made available by altering the roof trusses.

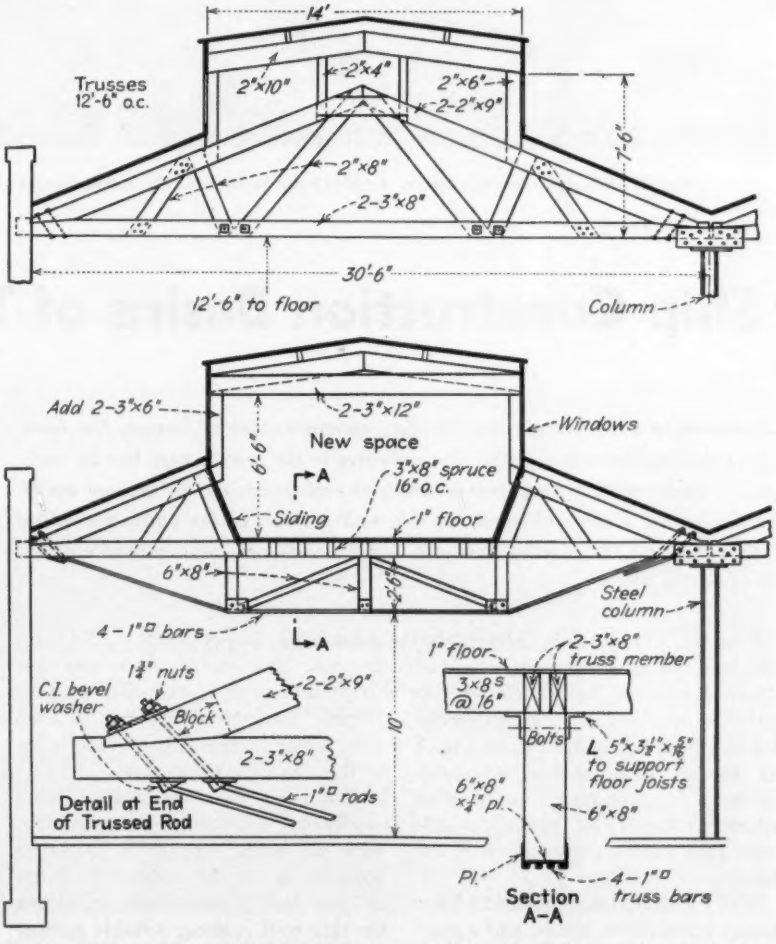
How alterations were made

The monitor structure of the building had sufficient headroom for a mezzanine, as well as providing light and ventilation. Use of steel beams to support the new floor was out of the question, but some one inch square reinforcing rods were available. Roof trusses were redesigned, using the bottom chord as the compression member of a trussed or hog-tied beam.

New members and reinforcement of the existing structure was made and the rods tightened to uniform stress (by sounding the four bars) before removing any of the members made useless by the change. Rods were tightened until the original truss showed upward movement, compensating for a large part of the deflection of the new supporting structure and preventing later sag.

Taking the truss load on the new members before removing the old one eliminated shoring and resulted in a minimum of interference with plant operation during the alteration work.

Total cost of the alteration was about $1 per sq.ft. of space added.



Upset-end rods were used to make a trussed-timber beam from a truss, clearing space for a mezzanine office in an essential but non-war industry.

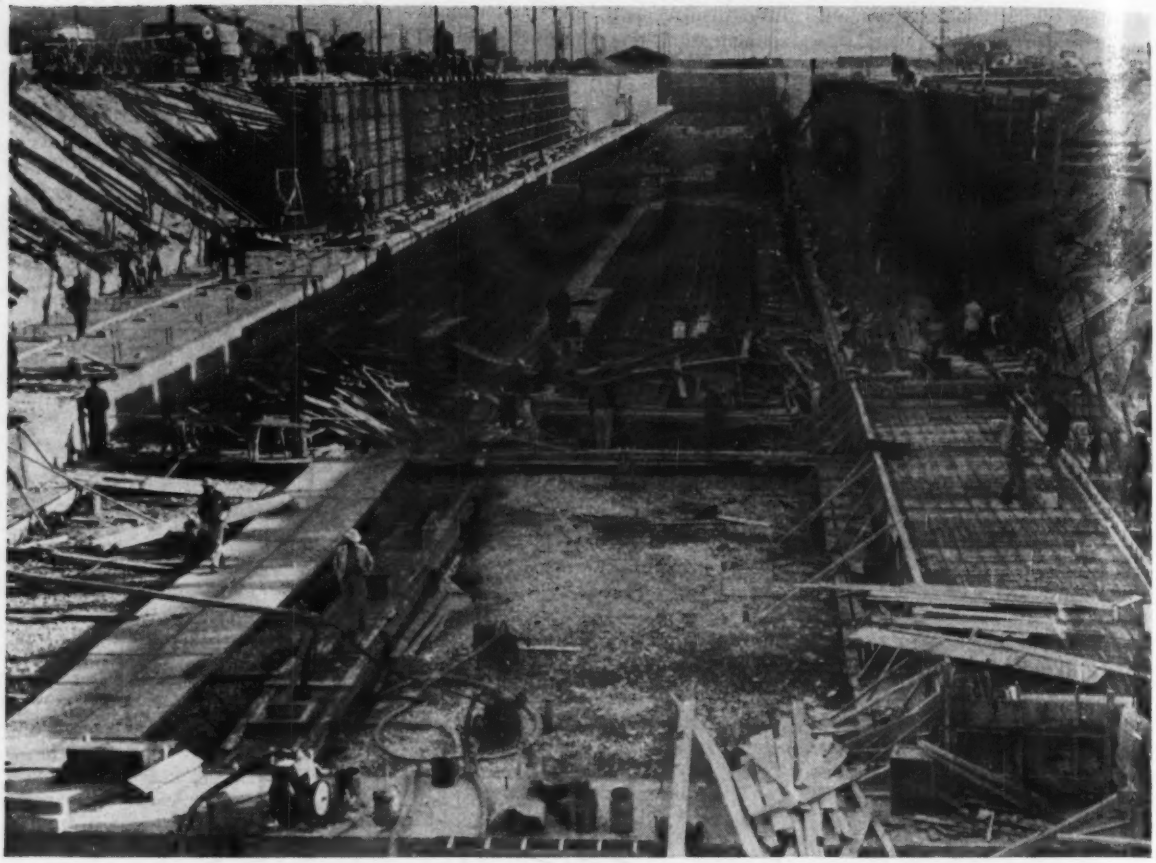


Fig. 1. Ship construction basins 1,200x82 ft. have 8-in. thick floor and buttressed 8 to 5-in. thick walls.

Ship Construction Basins of Thin Concrete

***Contents in Brief**—Basins for building concrete ships at Tampa, Fla. have thin concrete floors and walls. Groundwater in the area is kept low by wellpoints penetrating a rock stratum and pumped as needed to prevent uplift of the basins. Construction of the thin wall sections of the basins served as training course for placing concrete under conditions later encountered in building the ships.*

DEPARTING from the conventional drydock designed to resist uplift by sheer weight or by withdrawal resistance of piles, a series of basins for shipbuilding and a graving dock at Tampa, Fla., employ wellpoints to keep the structure from floating when unwatered; the wellpoints were also used during construction of the basins.

The installation includes three basins 1,200x82 ft. inside, and a graving dock 520x82 ft. Each basin will accommodate three concrete cargo ships while being constructed simultaneous. The graving dock was constructed to permit immediate docking of the concrete ships but it also will accommodate larger vessels up to the size of a C3 tanker.

The basin floor is an 8-in. thick moderately reinforced concrete slab, with the walls varying in thickness from 8 in. at the bottom to 5 in. at the top. Counterforts reinforce the thin wall, making it stable against a sand backfill and against water pressure when filled to float ships out. Buoyancy of the closed basins, with floor 20 ft. below mean low tide of an adjacent 30-ft. deep channel, is resisted by a system of wellpoints that provides for intermittent automatic pumping.

The site of the work is flat land, part tidal marsh, overlying typical Florida limerock at depths varying from 22 to 35 ft. This rock formation, at a former period, was the old land surface. Above the limestone is a bed of soft, light green marl, which generally forms a nearly impervious contact zone with the limestone. Below this contact zone the limerock is a fairly hard but very permeable formation that is connected with an adjacent ship channel producing an uplift pressure nearly equal to the full hydrostatic head of the nearby water.

At the surface of the ship basin area there is a hydraulic fill pumped over the original mud and silt. Below this exists beds of fine sand, soft clay and sand and shells down to the marl, all more or less impermeable.

The first problem was to effectively predrain the different strata above the rock, which was done by wellpoint methods common to difficult foundations. Following this the head of water in the limestone was relieved to reduce the uplift pressure, this being accomplished with wellpoints penetrating the rock stratum.

Natural ground in the basin area was at about El. +6 (0.0 is mean low tide with a 1.5-ft. tide range). Crawler shovels of 1½-cu.yd. capacity were used to excavate all material above the groundwater line, which was El. +2 or higher. At this level the first set-up of wellpoints was installed with 27-ft. long points jetted down at 3 to 5-ft. centers. This operation entailed the use of a "holepuncher" using air and water jets to thoroughly break up the more impervious layers and to develop a large filter area around each wellpoint. The hole opened up around each point was graveled with a finely crushed limestone mixture. Pumping on this set-up lowered the water table so that excavation could be made to about El. —15 in two shovel cuts.

Along the edge of the sloping bank, at El. —15, a second level of wellpoints was installed, 27-ft. long points being jetted down at from 5 to 7½-ft. c. to c. The wellpoint screens had to penetrate the soft limestone and enter the harder limestone where they could tap the openings and cavities to overcome the uplift pressure. This lower system of wellpoints was left in place to permanently keep the groundwater level down and prevent flotation of the low-weight basin.

After pumping on this set-up had reduced the uplift pressure and dried up the marl the shovels excavated to El. —20.7. Upon completion of the general excavation a small crane carried on excavation to El. —24 for a drainage tunnel in the center of each basin.

Draining the first basin required that the area be surrounded completely with the top system of wellpoints and almost surrounded with the lower system. Additional basins required wellpointing only on the side farthest away from the pumping operation already under way in the adjacent basin.

Location of basins and graving dock

The three basins and the graving dock are parallel but at an angle to the ship channel to permit easy maneuvering of boats out of and into the docks. Successive basins were each set 100 ft. ahead of the adjacent one to bring its outer end near the pierhead line. The river end of the basins was protected during construction by a berm placed partly in the channel and its outside blanketed with selected impervious material. A line of header and wellpoints was installed near the outside edge of the cofferdam to stabilize the berm, much of which consisted of silt and soft mud.

A sheet pile cut-off wall to the limestone was designed for installation under the outshore end across the filled area between the basins. Despite previous unsuccessful attempts to use wellpoints in similar soil in the same area this installation proved effective without the sheetpiling, due probably to tapping and draining the limestone. Later a cut-off wall, of wakefield piling, was placed.

Material excavated from the basin areas was loaded on 2 to 3 cu.yd. dump trucks and hauled to other parts of the yard where fill was needed to make working and storage areas. Pervious material was stored for use in backfilling against the basin walls.

Excavation followed so closely behind the dewatering operation that the material in the basins did not dry out sufficiently to support the crawler mounted shovel so it worked on timber mats. Planked hauling roads were continually installed and removed to accommodate truck operation. After completion of the excavation to sub-grade, only the ramps required planking. The sandy marl at sub-grade level was dry enough to carry the weight of loaded truck-mounted mixers without planking.

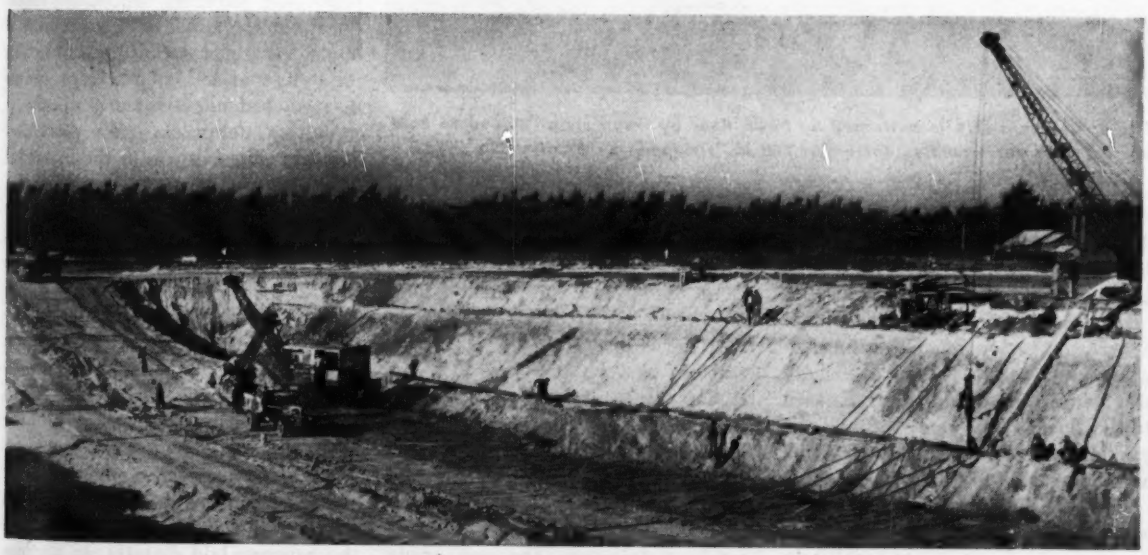


Fig. 2. Protected by two levels of wellpoints excavation for ship construction basins was possible to several feet below nearby water surface. Note "holepuncher" at right preparing hole for wellpoint.

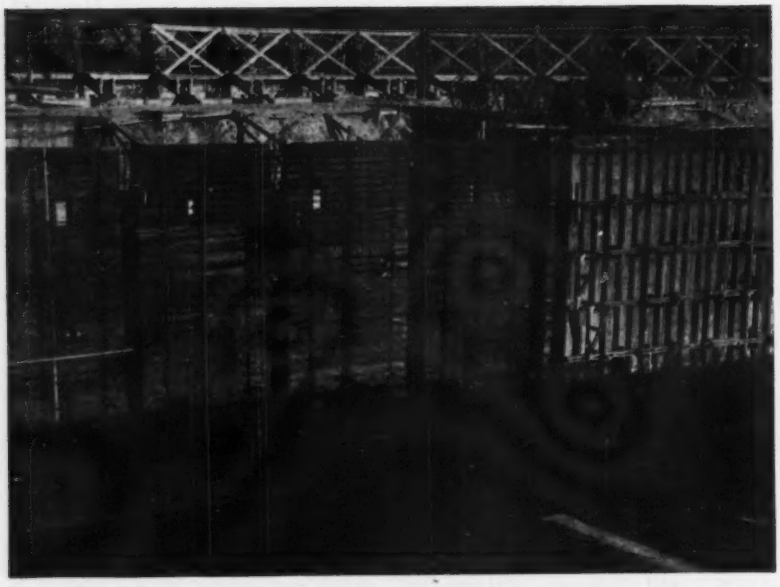


Fig. 3. Walls are concreted by buggies on top dumping into chutes that direct concrete through openings at two levels in rear wall.

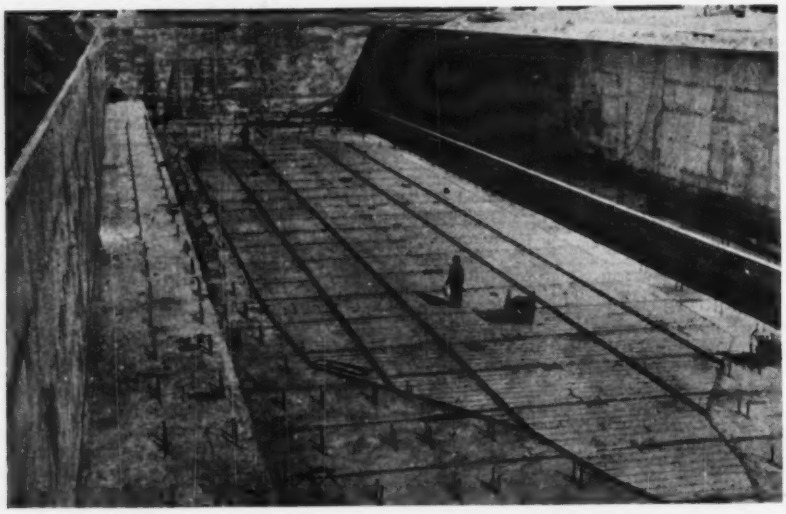


Fig. 4. Concrete ship is patterned on basin floor by wood strips placed to hold bottom form permanently. Bottom of hull is "stripped" by floating the ship.

It is noteworthy that where only 3 to 4 ft. of this sandy marl overlaid the rock, the excavation was bone dry and the entire hydrostatic head was overcome by the pumping. Where the rock extended above subgrade and had to be excavated, it was impossible to build up resistence to the flow of the water through the rock and large boils resulted. This was overcome by direct pumping.

The basin structures required a minimum of material and labor. Their design is more comparable to that of structures above ground than the usual dock depending on weight to resist buoyancy. The basins have their floor at El. —20 and the gate sill at El. —18.5.

Use of only an 8-in. thick bottom slab in the basins with 1 percent reinforcing is made possible by a construction plan for the ships that distributes the load uniformly over the entire bottom. Under the main section of the hull, the forms for the concrete rest directly on a prepared and shaped section of the floor and the load on the fore and aft frames is evenly distributed. The soil easily supports 3 tons per sq. ft. and loadings are less than half that amount.

Counterforts for the thin section vertical walls are at 10-ft. 8-in. centers, the same as the frame spacing of the ships; they are 8 in. wide in most locations and vary from wall-width at the top to 6 ft. and more at the bottom. Top of the buttressed walls is El. +7 with sand back-filled to within a foot of this elevation.

The method to be used in building ships in the basin makes it impossible to inspect the poured concrete bottom of the hulls. It is necessary to expose the bottom for painting and to check for possible defects before the vessels are put in service. To permit this operation a 520x82-ft. by 32-ft. deep graving dock is constructed adjacent to the basins. Walls are generally similar in design to those of the basins but the floor will be about 10 in. thick to support concentrated loads on keel blocks.

Concrete used for dock construction was designed for 4,000 lb. strength with 6½ bags of cement. Aggregates were white silica sand and white Florida limestone, a maximum size of ¾ in. being used. Reinforcing was computed at 25,000 psi.

Concrete plant

Concrete for construction of both basins and ships is batched through a job plant and mixed in 5 cu.yd. truck-mounted mixers as it is hauled to point of use. All materials are delivered by rail, bulk cement merely being shuttled from a mill, within sight-of-the-job, in covered hopper-bottom cars. The cement is taken from the cars by an undertrack screw conveyor that delivers it to the boot of the bucket elevator for hoisting to a separate high bin from which it is batched into the truck-mixers.

Bottom dump cars are provided for aggregates also, with the material being transferred to stock piles by a portable stacker that serves the several aggregates. Material is recovered from stock by a belt conveyor in a tunnel under the piles and delivered to a four-compartment, 4,300-cu.ft. bin equipped with weighing batchers. The plant will batch up to 120 cu.yd. per hour, more than double the expected rate of placing when ships are being built.

Construction of the concrete floor of the basins was done in convenient width sections across the dock with the concrete laid directly on the undisturbed material at the bottom. A trench 18-in. square, midway between

the buttresses of the basin and the frames of the ship was excavated across the full width of the bottom and immediately backfilled with rock to make a French drain and eliminate the possibility of static pressure under the floor. Concrete was distributed by truck-mounted mixers hauling to the edge of the excavation and discharging down chutes for direct placement or for further distribution by buggy.

A second pour was made of the "altar" section along each side of the dock and then the forms erected for the 21-ft. high wall. These forms were built in sections to fit one side of the counterfort wall and a little less than half of the width between the buttresses. A 6-in. wide "rip" strip with beveled edges, where the two forms join near the center, was used to loosen the forms and provide room for removal.

The face wall was formed with straight panels 16 ft. long. Face and rear walls were both of plywood with studs at 16-in. c.c. and horizontal wales tied with plain round rods that were withdrawn after concreting was complete. The form rod holes were not filled but were left open as drains to prevent hydrostatic pressure outside the walls. Beside the rod holes, regularly spaced 4x4-in. openings were left through the concrete near the bottom of the basin for additional drainage. These openings have salt-hay and gravel around the outside to prevent sand flowing with the water into the dock. Drains will be covered from the inside when the basins are flooded for the launching of ships and the covering removed as the water is later pumped down.

The system of wellpoints used at the lower level to completely unwater the work area were put in a position just outside the basin walls where they are retained for permanent use. Large openings were left through the wall and after the completion of the altar platform, a permanent 12-in. header line was installed on the inside of the basin against the wall at the altar elevation. The wellpoints were then disconnected from the original header line and hooked up to the new header. Outside the wall a layer of stone covered with salt-hay was used to form a passageway to the wellpoint taps for percolation water.

Pumphouses were built between each set of basins, low enough so that pump suctions are level with the header line. Each pumphouse contains a 10-in. electric-driven wellpoint pump and a 10-in. gasoline-powered pump for standby service. The piping systems are so arranged that the standby units on either side of the basin can be used for dewatering the basins after ships have been launched.

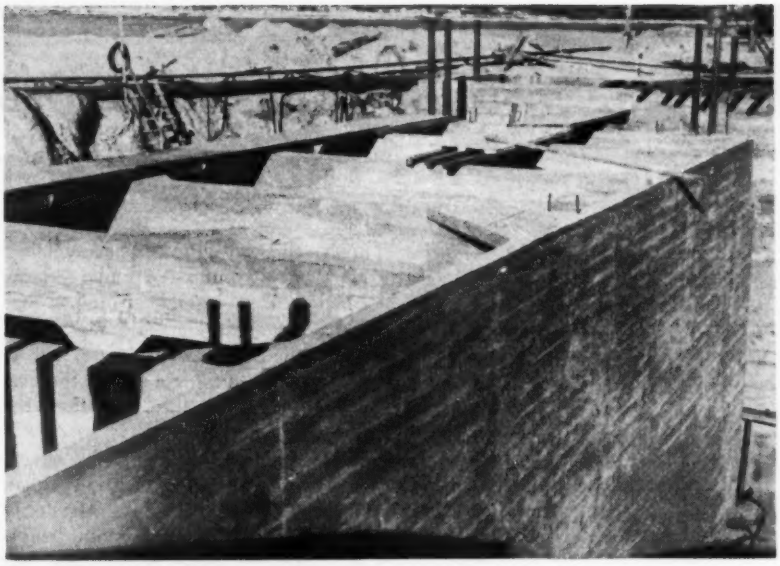


Fig. 5. Gate at water end of basin is a floatable concrete box, poured in place.

The capacity of the two gasoline standby units is sufficient to dewater a basin in about 36 hr. Auxiliary portable pumps can also be used at the outshore end if desired. The permanent wellpoint setup for the three shipbuilding basins and graving dock requires 6,000 ft. of header, 900 wellpoints and eight 10-in. pumps.

Floatable concrete gates

The gates developed for the dock are of unusual interest as they use a minimum of critical material, are inexpensive and were built in place when wanted. The opening across the dock is 72 ft. wide with a 20 to 22-ft. water depth over the sill. A floatable concrete box 65x28 ft. with walls 5 to 8 in. thick was designed to fill the opening, leaving 3.5 ft. on each side to give plenty of room for stripping the forms after construction and for maneuvering the completed box. It is well braced and is provided with a 24-in. pipe and a long stem valve on both outside and inside of the box for water control.

The concrete gate rests directly on a concrete apron of the dock with the bottom thrust taken against a 1.5-ft. high sill in which a timber is imbedded to permit caulking, against the head, if required. It is expected that a minor amount of leakage will occur around the gate and stop logs but this can be handled by the available wellpoint system pumps at little cost.

Two sets of stop-log slots are provided at each end of the box for an assembled timber frame to be dropped in to close the opening. Seals are merely railroad rails embedded in the concrete with the head exposed. Flooding of the basins will be done by opening the 24-in. dia. valves and removing a few of the top logs permitting the water to spill over.

McCloskey & Co. of Philadelphia are building the basins under direction of M. H. McCloskey, Jr., with Neal A. Melick, project manager, Nelson Tallman, general superintendent and T. J. McCormick, chief engineer. Thomas C. Gill of the Moretrench Corporation was consultant on the wellpoint installation and unwatering of the site.

Design of the basin structures was made by Frederick R. Harris, Inc., consulting engineers of New York. The floatable concrete gates were suggested by Superintendent Tallman of the contractor's forces.

The basins are being built for the Ship Design and Construction Division of U. S. Maritime Commission. Rear Admiral H. L. Vickery is head of the division, J. L. Bates, technical director; L. R. Sanford, regional manager and A. C. Gabriel, resident plant engineer at Tampa.

Metal Manhole Covers Replaced With Timber or Concrete

TIMBER MANHOLE COVERS are being used in extensions of Los Angeles County sewers, and Las Vegas, Nev., selected reinforced concrete covers for an entire new sewer system last year. These examples typify the manner in which communities are finding means of saving critical materials by adopting wartime designs for this item in which cast iron has so long been the universal standard.

Laminated timber covers

The timber cover, designed to support a wheel load of 16,000 lb., for Los Angeles County use is fitted into a circular concrete frame that will accommodate, without alteration, replacement with a cast iron frame and cover when the present emergency passes. These covers have been used on new construction in local improvement districts, in defense housing areas and on a long trunk sewer to serve an Army cantonment.

The cover itself is made of 2x8 and 4x8 No. 1 common Douglas fir, surfaced four sides. The pieces are fastened together with water-resistant glue and nailed with five 20-d nails except for the outer boards in which four 30-d nails are driven in $\frac{3}{16}$-in. holes. Laminations are put together to form a roughly circular block, which is then rotated around a central pivot against a band saw blade. By tilting the saw table the cut is made at a slight angle so that the bottom diameter is 2 in. less than the top diameter.

After the circular cut, the covers are pressure treated with Wolman salts as a protection against decay and termites. When available, two $\frac{1}{2}$-in. diameter steel reinforcing bar hoops are used in the concrete frame, one near the top and one near the bottom. The timber cover is made to take its final position enough below the finished grade of the street so that a wearing surface of emulsified asphalt placed on top to provide a protective cover and to prevent slivering, will finish off the manhole at exactly street grade.

Two types of concrete frames have been used with timber covers; one cast in place and one precast. For the former the cover is used as the inside form. The beveled edge is covered with two layers of 90-lb. roofing paper and prior to pouring concrete the cover is suspended at street grade. After the concrete has set, the cover is withdrawn and the paper removed. The precast concrete frame, containing 0.20 cu.yd., is set in mortar on the brickwork of the sewer and, since it is cast in steel forms under quantity production methods, it is rated, by county authorities, as giving a more satisfactory job than the poured-in-place frame.

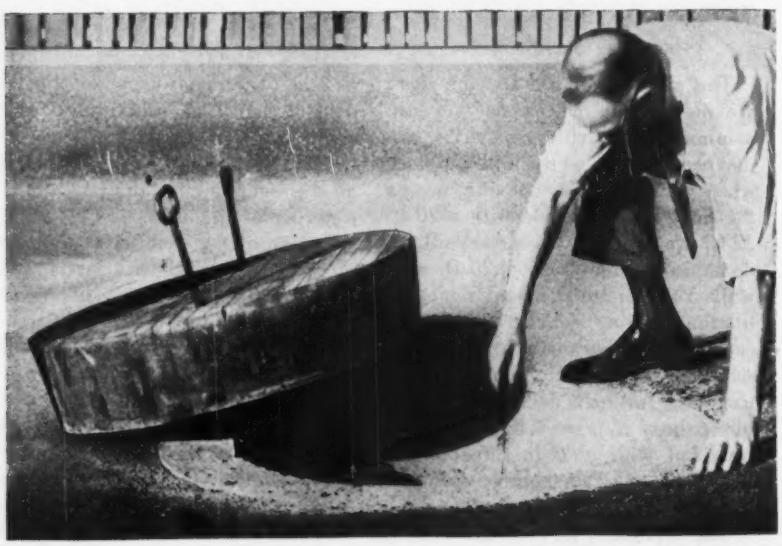
Comparative cost data

A lumber mill that has fabricated some 200 of these timber covers has quoted prices, on lots of 100, as follows:

Labor and material for cover	$11.00
Labor and material for gluing	1.90
Pressure treating (70 b.f.)	1.40
Total f.o.b. mill	$14.30

A concrete manufacturer who has made several hundred sets of covers and precast frames quoted the following f.o.b. prices:

Labor and materials; glued, pretreated cover	$14.40
Labor and material; precast concrete frame	12.50
Total price if frame and cover are ordered together	$24.40



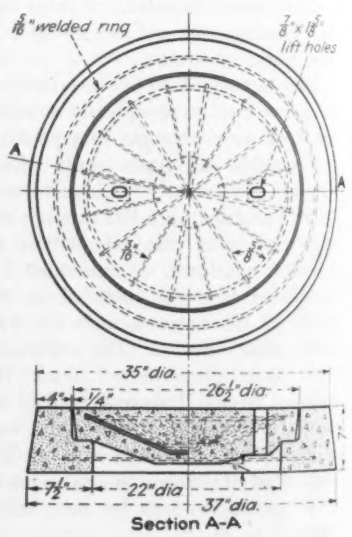


Fig. 1. Installing a laminated timber cover in concrete-frame. The unit is designed to support a wheel load of 16,000 lb. Handles provide for a two-man lift. Construction details of a reinforced concrete cover is shown at right.

The design for these timber covers has been developed and the covers have been installed under the supervision of Alfred Jones, Los Angeles county engineer and county surveyor; C. E. Arnold, chief deputy.

Reinforced concrete covers

Although the timber covers have given satisfactory service, those who fear that swelling might interfere with easy removal have adopted a reinforced concrete design, of which almost 1,000 had been made by one firm as this was written. In Fig. 1 the radial reinforcing for an all-concrete cover is welded to the encircling ring, making a steel assembly that weighs only 8 lb. Tests in a commercial laboratory 7 days after pouring showed that concrete covers reinforced in this way and installed in a concrete frame withstood a 59,000-lb. load before initial failure and 69,000 lb. before final failure. In these tests the load was concentrated in the center of the cover on 123 sq.in. of load area. This loading is considered as having a factor of safety well in excess of three because the maximum legal load that could be so concentrated would be 16,000 lb. to which 25 percent should be added for impact.

It is to be noted that the shorter radial bars are bent into a hook on the free end. The concrete used averaged about 5,000 lb. per sq.in. under compressive strength tests.

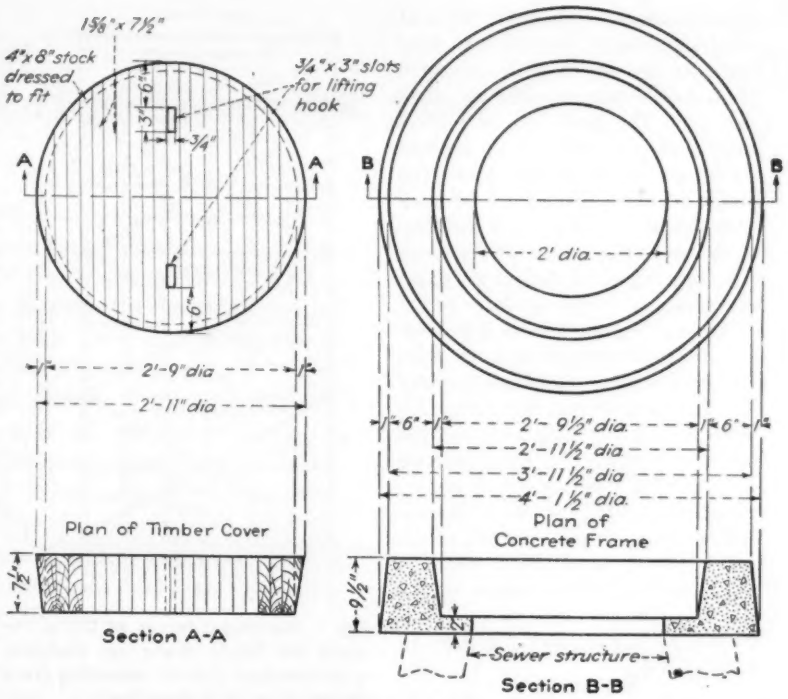


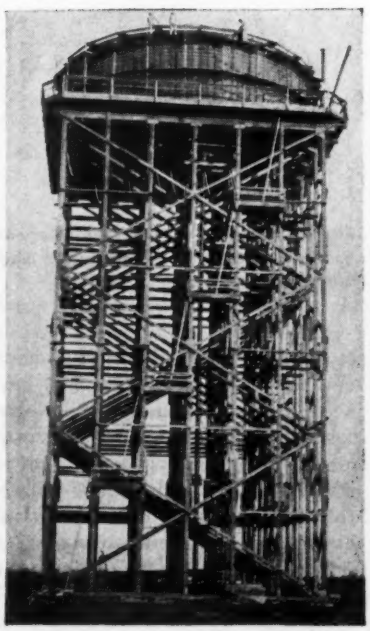
Fig. 2. Details of timber manhole cover and concrete frame. Both cast-in-place and precast frames have been used with timber covers.

The detailed drawings of the reinforced concrete cover were obtained from the Art Concrete Works, Pasadena, Calif.

Wood Stave Tank On a Timber Tower

To AVOID USE of critical materials as far as possible and at the same time to meet requirements for water capacity and pressure at a large army camp, a water tank was recently designed and built that considerably exceeds standard practice both in height of the supporting timber tower and in the size of the elevated wood stave tank itself. However, once plans were officially approved, interest developed in other quarters and even before the completion of the original structure, work had started on other tanks and towers of the same size and type at several other Army and Navy establishments. The tank capacity is 300,000 gal. and the tower height is 100 ft.

At the location where the first tank was built the foundation required the use of piles which, after being driven to firm footing, were capped with a concrete mat 60 ft. square and 4 ft.



3 in. thick. The steel reinforcing used in this slab was put there to meet the requirements set up by the provision for a horizontal force of 0.1g. on the completed structure and for proper distribution of dead loads over the pile foundation. Under the assumption of this horizontal force, the governing condition on this structure occurred when the direction of the force was along one of the diagonals of the square.

The surface of the concrete is 6 in. higher in the center than at the edges to provide drainage beneath the tower. Footings for the 49 timber columns are small concrete piers, ranging up to about 7 in. in height, all topped off at exactly the same level.

The vertical columns that constitute the main tower members are 12x12-in. timbers, whose butt joints, made with split-ring connectors, are de-

signed to carry 75 percent of the load under conditions of maximum dead load. At the top of each column a 12-in. steel I-beam is used as a column cap. The bent caps or girders consist of two 12 x 14-in. timbers placed one on top of the other. The double thickness is required for horizontal shear, not for cross bending.

An interesting feature of the tower is the bracing which stiffens the structure against a horizontal force of 0.1 g. Stresses resultant from this force would exceed those set up by a 30-lb. wind on the tower *with sides boarded up*. The first designs for joints between the 6 x 8-in. diagonals and the outside columns had to be abandoned in favor of a joint, shown in the accompanying detail, in which the center lines of the braces intersect on the center line of the column. This arrangement made it necessary to use steel gusset plates with shear plates of 4-in. dia. for transferring stress to the diagonals.

Designed as a vertical Warren truss

The tower was designed as a vertical Warren truss in which the panel points are the connections between diagonals and outer columns. Where the diagonals pass intermediate columns a bolted connection is used to decrease the unsupported length of the member. The diagonals are designed to take both tension and compression and all joints are made with timber connectors. Arrangement of the diagonals to avoid interference of members in the two planes normal to each other required considerable scheming but was effected with clean lines as shown in Fig. 1. Runs of horizontal 6 x 6's were put in, as will be seen in Fig. 1, to decrease the *l* over *d* ratio.

Construction of floor system

The floor system surmounting the tower is carried on 3 x 16-in. joists whose centers are about 11 in. apart except over the rows of columns where four 3 x 16's were used to make up a laminated 12 x 16-in. beam, thus matching the width of the 12-in. floor girder. The 2-in. floor boards were spaced for drainage. The deck is 66 ft. square, making use of a 5-ft. overhang beyond the outer girders. The tank itself is 58 ft. in diameter, inside, and is 16 ft. deep.

The relatively large ratio of tank diameter to depth was selected to distribute dead loads over the large

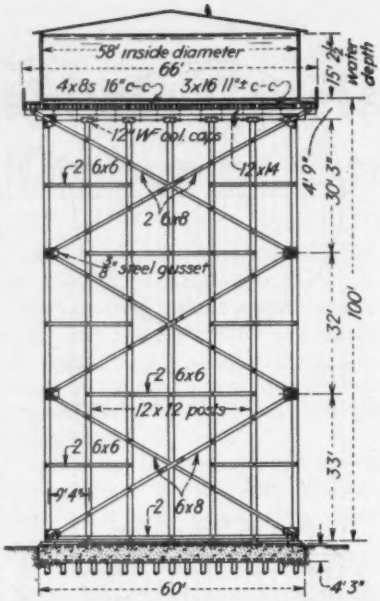


Fig. 1. Horizontal forces of 0.1 g, for which this 100-ft. tower was designed, would produce stresses exceeding those caused by a 30-lb. wind load.

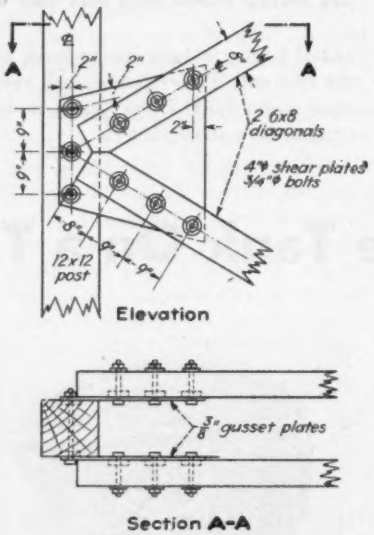


Fig. 2. Connecting between diagonal braces and outside columns were made with shear plates.

tower area required for economical design. From experiments that have been made on models, the designer concluded that for any probable earthquake motion with a given tank capacity, the shear in the tower will be relatively smaller as the ratio of tank diameter to depth is relatively larger.

The ladder to the top of the tower, much resembling a series of ship's companionways, makes the ascent in five lifts on one of the vertical faces.

The tower design was developed by Harold B. Hammill, consulting civil engineer, San Francisco. C. C. Kennedy was the architect-engineer, and on the first project, The Redwood Manufacturer's Co. held the erection contract on both tower and tank.

Ontario Begins Diversion Of Water to Great Lakes

Diversion of water from rivers flowing north to Hudson's Bay over into rivers flowing into the Great Lakes—St. Lawrence drainage basin, to augment the power resources of Ontario, has been begun by the Hydro-Electric Power Commission of Ontario. Sometime ago the commission began construction of a dam on the Ogoki River and construction of a channel from the lake formed by the dam over into the Little Jackfish River, a tributary of Lake Nipigon (*ENR* April 24, 1941, p. 599). The commission has power plants on the Nipigon River, between Lake Nipigon and Lake Superior, where the added flow can be used; the flow also can be used in power plants at Sault Ste. Marie, Ont., and at Niagara.

Speaking recently at Port Arthur, Ont., T. H. Hogg, chairman and chief engineer of the commission, stated that the federal government of Canada had formally approved the Ogoki and Long Lake diversion schemes. Diversions of 2,000 c.f.s. from Long Lake into Lake Superior to bring down pulpwood have been in progress for some time without formal approval. Engineers of the commission's staff soon will release 1,000 c.f.s. into the Little Jackfish River through the new channel; by next summer it is expected that this flow will be stepped up to 10,000 c.f.s.

Under an agreement between the United States and Canada entered into in the fall of 1940 when the power situation in the Niagara district was getting acute, Canada was authorized to increase the diversion of water at Niagara by 5,000 c.f.s., the increase to be offset by the diversions into Lake Superior that are now being made.

The Ogoki diversion project cost $5,300,000, or $200,000 less than the estimated cost; the Long Lake work cost $1,300,000.

Notes on the A.S.T.M. Meeting

● Greater aid for the war effort was the theme of the 46th annual meeting of the American Society for Testing Materials at Pittsburgh June 28-July 1. Many new specifications were acted upon to permit the manufacturing industries to use familiar materials in new ways and to substitute for more critical materials. However, of greatest interest to the construction industry were the papers describing the advancements in the ordinary uses of old materials and newer test procedures. In the following pages are abstracts of some of the reports and discussions of interest to *Engineering News-Record* readers. In the July 8 issue of *ENR*, a news report on the meeting told of the large attendance, new officers, and those members honored for their association with the society for 40 years.

Chosen to give the Marburg lecture, L. J. Markwardt, chief of the division of timber mechanics in the Forest Products Laboratory, told of the extensive use of timber for the war program in what he termed the renaissance of wood.

Markwardt said the latter had occurred because of the following factors: (1) Improvement in joints and fastenings; (2) Better structural grades, affording more precise strength evaluation and uniform quality; (3) Improvement in glue and glueing technique, including the development of synthetic resins that afford essentially waterproof joints; (4) Extensive developments in plywood production, making available a large variety of constructions, with moisture-resistant properties, if desired; (5) Advent of chemical seasoning methods, which not only result in quicker drying, but in the practical elimination of drying defects; (6) Increased facilities for wood preservation, affording opportunity for increased life and serviceability and reduced maintenance costs; (7) Composite constructions, using wood with other materials, and employing to best advantage the salient properties of each; (8) Improved wood, plastics, and paper-base laminates involving chemical conversion or resin-impregnation; (9) A wide variety of fibreboards with properties designed to meet particular requirements; and (10) New developments in molding and laminating techniques, permitting the bending, forming and assembly of complicated and intricate structural parts.

Soil classification changes proposed

During the morning session of the one-day symposium on soil test methods, C. A. Hogentogler and E. S. Barber, both of the Public Roads Administration, Washington, suggested a new classification of materials for subgrade and granular type roads. The old subgrade classification consists of light types designated A-1 to A-8, inclusive. In the original PRA classification, groups A-1 and A-2 were described with respect to their performance in granular type road surface and base courses. At that time the same materials were assumed equally suitable for use in both granular-type road surfaces and base courses and the A-1 materials were so described.

According to Hogentogler and Barber, this assumption has proven true of only a relatively few materials. As a result Class A-1, as first identified, contains some materials unsuitable for bases, and Class A-2, originally intended for materials inferior to the A-1 types, includes some of the better base-course soils. Thus, the present A-2 friable group of soils, or those free from frost risk, would be identified as A-2-a and the present A-2 plastic group, or materials likely to be damaged by frost, as A-2-b.

The original A-3 group consisted of sands and gravel typified by good drainage, absence of frost damage, and high stability as sub-grade. Since current identification is considered to place more emphasis on resistance to frost action than drainage properties, Hogentogler and Barber would identify the A-3 materials as more permeable and suitable for use as sub-bases where free drainage is a principal requirement. They would eliminate the A-8 group, which was originally intended to designate a very soft and unstable condition of the subgrade in its natural state in the soil profile. Since the presence of peat and muck are responsible for the poorest varieties of the A-5 and A-7 groups, the authors would place subgrade material previously classified as the A-8 group in one of the other groups. Thus, new subdivisions as follows were suggested:

Group A-4—Relatively cohesionless material (silty soils).
Group A-5—Relatively cohesionless material with elasticity (silty soils containing mica, diatoms, peat, etc.).
Group A-4-7—Moderately plastic soils without elasticity (silt loams).
Group A-5-7—Moderately plastic soils with elasticity (silt loams with mica, diatoms, peat, etc.).
Group A-6—Highly plastic soils (colloidal clays).
Group A-7—Plastic soils (clay loams).

Many new test procedures for soil study were outlined during the soil symposium. A paper prepared by Keith Boyd, North Dakota Highway Department, described a method of determining the bearing power of soil by means of a cone bearing machine. Advantages claimed for this method include: the test machine is easy to construct and operate, accurate readings for a wide range of bearing values may be obtained readily, and the data secured, when properly interpreted, will supply information comparable to that obtained by any other method.

A manuscript prepared by L. A. Palmer, engineer in soil mechanics, Navy Department, Washington, D. C., outlined what is considered a new procedure for determining the true shear resistance of soils by the direct

shear method. The equipment required is not new, having been in use for five years. Formulas for evaluating test readings were presented.

A method never heretofore described in technical literature for saturating strength-test specimens of cohesive soil was outlined in a paper by L. E. Gregg, research engineer, Purdue University experiment station. Cohesive soil having either natural or remolded structure may be saturated in preparation for strength tests by the method, which is particularly applicable to samples later to be tested in compression while laterally supported. The required equipment consists mainly of a pressure saturator with one or more chambers designed to accommodate specimens of 3-in. dia. and 7-in. long. The equipment is considered readily adaptable for permeability measurements after the soil is saturated and before the specimen is destroyed in the strength test.

Test for soil-cement mixtures

M. D. Catton, manager of the soil-cement bureau, Portland Cement Association, outlined an advanced method for the chemical determination of the cement content of the soil-cement mixtures. The procedure involves treatment of samples of untreated soil, soil-cement mixture and cement with hydrochloric acid, removal of the insoluble residue by filtration, double precipitation of the iron and alumina in the filtrate and, finally, the precipitation and determination of calcium in the combined filtrates from the iron and aluminum precipitations. The percent of cement in the soil-cement mixture is then calculated from the percent calcium oxide in the untreated soil, soil-cement mixture and cement. Formulas for this work were made available.

In discussion of the method Jacob Mizrock, Public Roads Administration, Washington, made known that time could be saved if the calcium in the filtrate from the acid insoluble residue could be determined accurately without removing the iron and aluminum. A method to determine the calcium in an acid solution was worked out. A comparison of results by the two text methods showed the percentages of the cement formed by the two procedures to be identical for nearly fifty percent of the test samples and to vary by not over 0.2 percent for the remaining tests.

An advanced test method for evaluating the weathering properties of road tars was described in a paper by E. O. Rhodes and H. E. Gillander, both of the tar and chemical division of the Koppers Co., Pittsburgh. Air at a temperature of 30C. is passed through a tar-sand mix having tar films in the order of 0.006 mm. thick and extensive weathering is brought about in 23 hr. time.

The test has been used to some extent in studying road tar specifications. Results indicate that, in general, and particularly in the case of the hot-application grades, the softening point of the 300C. distillation residue may be used to estimate the serviceability of the road tar when employed with proper types of construction. The results also indicate that it is desirable to have closer distillation limits in the case of the cold-application grade road tars.

The method in its present form is suitable for testing those materials which change primarily as the result of evaporation. The acceleration is obtained as the result of using extremely thin films that permit the maximum amount of evaporation in a given time. The method cannot be used to evaluate materials which change through oxidization which may or may not be accelerated by light.

Performance of slow-curing asphalts

Work by the Wisconsin State Highway Department in developing a method to correlate the performance in service of slow curing asphalts with laboratory studies was described by Joseph Zapata, chief chemist for the department. The laboratory tests were made as a heat test to determine residue of specified penetration (A. S. T. M. Method D243-28T). The field studies were carried out in two ways: (1) On mats placed in selected locations and chosen as to type of traffic, aggregate, base condition, drainage, and method of construction, and (2) mats picked at random on the state road system. As a further study, briquets made from glacial drift sand and the residue remaining after different periods of heating the slow-curing asphalts were tested in the laboratory for compression strength and resistance to impact.

Conclusions reached by the work included: Field and laboratory evidence indicate that a heat test can be used for the evaluation of performance in service of slow curing asphalts. The test can be used for control purposes by either specifying the time required to reduce the consistency of the asphalt from original to a consistency of either 100 or 150 penetration, or by specifying the consistency of the residue obtained after heating the asphalt for a given period of time. The time of reduction or the heating period required to obtain a residue of given consistency can be determined for an asphalt or asphalts which have given satisfactory performance in service and this time may then be used as a specification requirement. A consideration of construction practices followed in using the asphalts is of great value in establishing the requirement.

Developments in concrete

One of the most interesting papers in the sessions on concrete and cementitious materials was that by Thos. E. Stanton, California Division of Highways, describing the California studies to develop an accelerated test procedure for the detection of adversely reactive cement-aggregate combinations. Considerable research has been carried out in California during recent years to determine how the excessive expansion of concrete is traceable to some chemical reaction between the cement and the aggregate.

General conclusions from this work, as outlined by Stanton include:

1. The best proven procedure for acceleration of reaction between cement and aggregate is curing under constant humidity conditions with neither excess or deficiency of the optimum moisture to accomplish the reaction.

2. The initial reaction is accelerated by temperature. Although in some cases the ultimate magnitude of the expansion may be less under higher than normal temperatures, tests at 100 to 110 deg. F. and possibly even at 130 deg. F. are valuable as early indications of adverse combinations. Curing at either 100 deg. or 110 deg. appears preferable to 130 deg. F.

3. The cement content is an important factor. While no evidence has been developed to show that the excessive expansion noted in 1:2 mortars will in time be duplicated in the

field with leaner mixes, nevertheless if early information is desired with regard to the probable reaction characteristics of a given fine aggregate, a 1:2 mortar mix should be used. Richer mixes should be used only where richer mixes are to be used in construction.

4. Curing of expansion test bars by immersion in an alkali solution undoubtedly accelerates the action. This test merits further study and serious consideration as a possible substitute for curing in a sealed container.

In discussion of Stanton's findings, L. Schuman and F. B. Hornibook, both of the Bureau of Standards, in a joint paper described experimental work on the same problem. They reported that a higher storage temperature (100-105 deg. F.) usually, but not always, accelerates the expansion of the concrete. Some materials, such as a sand from Spokane, Wash., have shown very little expansion with a high K_2O cement in one year at 70 deg. F., but a definite, though still rather small, expansion (0.04 percent) in 6 months at 100-105 deg. F. A sand from Kimball, Neb., however, gave greater expansion (0.07 percent) at 70 deg. F. than at 100 to 105 deg. F. (0.02 percent) in 6 months. Though it was believed that abnormal expansion obtained with such materials as the Parker Dam felsites or the Cowlitz River, Wash., andesite are due to their glassy constituents, tests on both the natural glass obsidian and on a rhyolite containing about 50 percent glass, using 30 percent by weight of cement of the 30-80 size, showed no abnormal expansion in 6 months at 100 to 105 deg. F. However, a pitch stone tested similarly gave 0.085 percent expansion; and silica-brick (largely tridymite) gave 0.68 percent.

Simplified tests for mixers

A simplified test for evaluating the effectiveness of concrete mixers was outlined in a joint paper by S. P. Wing, Valens Jones, and R. E. Kennedy, all of the U. S. Bureau of Reclamation. The test is simpler than the Patch efficiency test as described by the American Concrete Institute in 1939, and the results are expressed in standard terms. The test consists in determining by specific gravity methods the weight per cubic foot of samples of the "airfree" mortar screened from concrete samples taken from three different parts of the test batch. When a batch of concrete is mixed until the average range in weight of the three samples is less than 0.8 lb. per cu. ft. the concrete is as thoroughly mixed as can be determined from the test, but there will be no difference in strength of the samples which can be ascribed to insufficient mixing, according to the authors.

Variation in cements

"Variations in the Strength of Portland Cements Conforming to the Same Specifications and the Relation of Such Variations to Concrete Control" was the title of a paper presented by S. P. Wing and Arthur Ruettgers, both of the Bureau of Reclamation. Data for the study were from 14,000 cement acceptance tests obtained in purchase of 5½ million barrels of low-heat cement from 10 different mills for one dam project, an equivalent number of tests for cement supplied for a second project, 20,000 control tests of concrete cylinders at two projects, and 4,000 concrete tests on various types of cement under varied conditions at the Denver laboratories. The tests indicated a wide range in strength of the cement coming from a single mill, and a somewhat greater variation between the cements of different mills.

Conclusions were that: With respect to structural and concrete mix design, where minimum strength specifications must be met, average strength by itself is not an adequate criterion to decide on the suitability or the quality of the concrete for the work in hand. With the coefficients of the strength of the cement from a single mill varying from 10 to 17 percent, average strength levels must be kept from 20 to 50 percent above the minimum strength specification requirement if safety margins are to be maintained over a long period. Increased attention to variability factors, both on the job and in test reports, will help to cut down these margins that cannot be used.

Use of inferior aggregate

Tests made in Missouri to determine the effect of vinsol resin as an air-entraining admixture on the resistance to freezing and thawing of concrete containing inferior coarse aggregate were described by E. O. Axon, T. F. Wills, and F. V. Reagel, all of Missouri State Highway Department. Four different coarse aggregates were used, two limestones and two chert gravels. Concretes having air-contents of approximately 1, 4, and 7 percent were tested. A normal portland cement gave an air content of 1 percent, and cement ground with 0.1 percent of vinsol resin was blended with the normal cement to give the air contents of 4 and 7 percent. Concrete prisms 3½ x 4½ x 16-in. made from the different mixes were tested in flexure at the age of 35 days and three or more sets of four prisms each were subjected to freezing and thawing tests of two types.

General conclusions

General conclusions from the work were: The use of vinsol resin as an air-entrapping admixture has certain definite effects on concrete. For concrete in the plastic state, it makes the mixture "fatter," improves placeability, and reduces bleeding and water gain. For concrete in the hardened condition it reduces the flexural strength and dynamic modulus, at least up to 35 days; but apparently has little, if any, effect on the thermal coefficient of expansion.

The information from the freezing and thawing tests was considered as indicative of certain trends. These trends were summarized as follows:

(1) Vinsol resin as an air-entrapping admixture caused no appreciable improvement in durability of concrete containing chert gravel of such characteristics that its use in pavement concrete has resulted in pavements of poor durability.

(2) In the case of chert gravel of such characteristics that its use in concrete has resulted in a fair service record, there is disagreement between the indications of the two freezing and thawing test procedures, which raises the question of the validity of the results of either or both procedures. There is only a slight chance that vinsol resin will benefit pavement concrete containing aggregate of this kind, but this chance and also the possibility that increasing the initial flexural strength will produce concurrent benefits, should be investigated.

(3) The entrapment of air improved the durability of concretes containing either of the two limestones.

CCC Buildings Salvaged for Army Camps

***Contents in Brief**—Because of a lumber shortage and the need to expedite construction, timber structures at several CCC camps were dismantled, moved by rail to army camps, and reassembled. Breakage was negligible and the dismantled buildings were assembled at the new sites at low cost.*

LATE IN 1942 the Louisville District, U. S. Engineers, salvaged for use at army cantonments and other war projects the demountable buildings at twelve former CCC camps. As a result, the major part of an original investment was saved, and the buildings became available for other use at a time when it was difficult to obtain lumber for new construction.

The camps where the buildings have been salvaged are as follows: Leitchfield, Ky.; Benton, Ky.; and Lincoln City, Waveland, Monon, Peru, Henryville, South Bend, Corydon, Chesterton, Wadesville and Fort Wayne, all Indiana cities. The amount of salvage has varied from 70 to 95 percent. The buildings moved included those used by the CCC for barracks, lavatories, latrines, mess halls, officers quarters, office supply, education, welfare, and recreation. In some instances the salvaged buildings also included the blacksmith shops, laundry buildings, oil houses, and garages.

Most of the buildings dismantled and moved to new locations are of an established standard construction 20 ft. wide and varying in length from 80 to 150 ft. The old foundations consisted of creosoted 2x12x24-in. blocks laid flat on the ground to support 6x6-in. creosoted posts of variable length surmounted by three 2x6-in. untreated timbers scabbed together as longitudinal sills. The floors are made up in 5x10-ft. panels and they consist of 2x8-in. joists and two layers of 1-in. flooring, separated by weather proof paper.

A. An old CCC building in process of re-erection on a new site. Side panels were bolted together and the wall unit attached to the floor with bolts. A few temporary braces were required. B. Roof panels were erected by two men working on scaffolds inside the building and by two men on the outside. C. Support for roof included timber trusses on 10 ft. centers. In transporting trusses to new site diagonals were left attached to bottom chord. D. New roof of 80-lb., 3-ply built-up roofing was laid over original covering.

The side walls consist of 2x4-in. studs on a 2-ft. 6-in. spacing covered by ¾-in. insulation, weather-proof paper, and 1-in. drop siding. The wall panels measure 5 ft. by 7 ft. 3-in. and are bolted together. At some camps the studs on the inside were exposed, but at the more northern locations the studs were wainscoted with 1x4-in. tongue and groove siding for the lower 4 ft. and the remaining 3 ft. 3 in. with wallboard. In these camps wallboard insulation also was used as a ceiling.

The 5x12-ft. roof sections consist of 2x4-in. rafters on a 2-ft. 6-in. spacing and covered by a ¾-in. insulation board, a water proofing paper, a 1-in. wood sheathing, and a tar roofing paper. In addition, at 10-ft. intervals transverse timber roof trusses, made up with 2½-in. dia. split-ring connectors are used, a rafter serving as top chord.

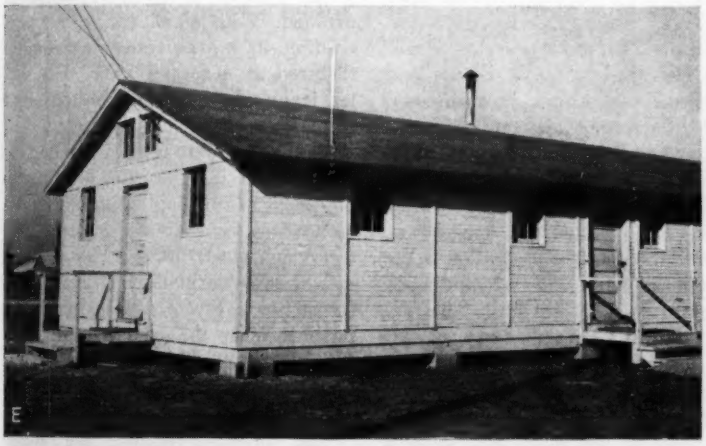
In dismantling the demountable buildings at the former CCC camps force account or hired labor was employed. Ordinarily a 20-man crew, consisting of one foreman, two carpenters, and seventeen laborers, was able to dismantle a 20x120-ft. building in 1½ days. In dismantling the first camps all the panels of the building were labeled with a code number to assure that all the sections for a particular building be used for the same structure at the new location; on later projects this did not prove necessary. First dismantling operation was to remove and crate plumbing equipment, electrical supplies and the window sash. Stoves and other equipment were not crated, but were shipped in carload lots.

Moved in sections

In the dismantling work the roof and side wall sections were taken down and piled one section upon another, unless trucks were waiting to be loaded. In contrast, the bolts joining the floor sections were removed, but panels were left in place until the trucks were available.

A time "saver" was developed in handling the timber roof trusses. On some of the early jobs the crew completely dismantled all members of a truss, but on more recent jobs a better plan proved to be that of removing the bolts in the upper ends of the diagonals and at the high point of the truss. This procedure permitted the trusses to fold down, but kept all of the members joined for shipping. This latter arrangement saved about 5 man-hours on the future erection of the trusses and avoided the danger of the parts becoming lost. The cost of dismantling the five 40-man barracks for a 200-man camp plus offices and other buildings varied from $5,800 to $6,000 per camp.

Two trucks were ordinarily used in hauling the sections to the railroad siding where a 6-man crew unloaded the sections and placed them in the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H

E. Re-erected CCC building with new concrete block foundations and a fresh coat of paint. F. Interior of typical building after being assembled on new site. The stoves are original equipment. G. At the opposite end of these 20 x 100-ft. wings (five in all) is attached a 20 x 270-ft. headhouse, which provides office space at a Kentucky camp. H. To heat the headhouse two hot-water furnaces were installed in this boiler house. Piping for the headhouse was suspended below the floor. Outside pipes were asbestos covered and buried under 2 ft. of earth.

railroad cars. When the buildings arrived at a new location they were transported from the railroad siding to the new site by truck. Very little damage in shipment occurred.

The agreements between the federal government and the land owners, made prior to construction of the CCC camps, provided that all structures and utility facilities and stone roads would be removed when the camp was abandoned and the land restored to its original condition. However, a more satisfactory plan followed by the Louisville district was to leave structures that were not demountable in place, transferring these structures to the land-owner in return for a release from the requirement for restoring the camp site. Generally, the value of the few remaining buildings that could not be moved was sufficient compensation so no damage was paid the landowner.

The dismantled buildings are being used for several different purposes. The pictures designated Fig. A to F illustrate use of the structures for barracks at an Indiana camp. For this use the only new materials required were a few concrete blocks for new foundations, supplies for a new roof, and paint to cover the exterior of the buildings. These buildings were erected almost as fast as they had been dismantled and followed the methods illustrated.

Some buildings used for office

At a Kentucky camp the old panels were used to construct an office consisting of a 270-ft. long head house and five wings each 100 ft. long. At this camp the buildings are considered more permanent and the structure was supported on 8x8-in. concrete posts resting on 20x20-in. square, 1-ft. thick concrete footings. Erection of floor, wall, and roof panels was all by hand. After the roof panels were in place, the old roofing was removed and a new 80-lb., rubberized, 3-ply roofing added. While this work was in progress, the exposed studs on the inside were covered with ⅜-in. wallboard, a 1x4-in. yellow pine flooring added over the old floor, the permanently exposed underside of the roof panels given two coats of light paint, and the exterior of the building painted.

Speed at which this work was carried out is shown by the following: In one day a 6-man crew put down the flooring, a 6-man gang added the new roof, two workers placed the new batting required on the exterior side of the walls, and two laborers spray-painted the permanently exposed lower side of the roof panels for a 20x100-ft. wing.

For the new office a forced hot water heating system was considered better than using the old stoves, especially so since two second-hand boilers of sufficient size were available. The boilers are housed in an adjoining 20x20-ft. boiler house with concrete block walls and wood-frame roof. Radiators on a 15-ft. spacing are provided along both walls of all wings and the head house. The necessary piping is covered with asbestos and supported from the floor framing, which required that the floor be at least 18 in. above the ground.

This salvage operation proved a valuable experiment in dismantling and relocating temporary demountable buildings—a profitable investment too for the government.

Col. Henry J. Hutchings, Jr., at the time the work was done, was district engineer at Louisville, and W. I. Gregory, civilian head of the engineering department, and J. S. Green, in general charge, and Wm. C. Young, in direct charge of the dismantling operations. At the several new locations the area engineers supervised construction.

Precast Building Frames Now Being Used in England

Precast concrete frames are now used extensively in England for industrial buildings, according to a recent description in the *Surveyor Magazine*. Designed by C. W. Glover and Partners, Folly Court, Workingham, Berks, the frames are said to be of low cost and to require little maintenance.

The frames are manufactured by casting one column and one-half of the roof beam as one unit and the opposite column and remainder of the beam as a second unit. This design permits a curved, pitch, or flat roof of broad span without trusses or ties. The purlins also are precast.

The frames are pin-jointed at the apex and at the base, and have a rigid joint at the eaves. As a result, the structure is statically determinate and may be designed as a three-hinged arch. The transverse strength of such frames is very high. Longitudinal stability is ensured by a tie rod at the ridge and by the bracing effect of walls between the frames, or by special members. Also, this type of framework, which is designed to allow for slight movements at the pin joints, has a high resistance to bombings. An added advantage is that settlement of the foundation can be taken up by movement of the joint at the ridge.

Desirable spans for this type of construction range from about 20 to 100 ft. Two methods of casting the frames are used. When the span is from 30 ft. upwards, the frames are precast on the building site. Thus, transportation of the heavy units is avoided. With small spans, not exceeding 40 ft., the frames are manufactured at a central yard. The latter frames have a rigid bolted joint at the eaves.

The most economical span for frames cast on the site is roughly 60 ft., considering framing costs alone, and for frames cast in a central yard about 30 ft. The spacing of frames is normally 15 ft., which is a suitable length for precast concrete purlins. When the span is small, say, from 20 ft. to 25 ft. the purlins are omitted, and the frames spaced on about 6-ft. centers.

The three-pin frames are sometimes combined in a series of parallel spans to cover any required area. In this case the end-frames are cast with a cantilever, forming an extra half-bay, and entirely freeing the outside wall from supports. Also the frames are sometimes used in multi-story buildings. In this case the lower stories are of monolithic construction, but may be partly pre-cast and erected with monolithic joints.

The amount of steel required for the precast framework is low compared with other types of construction. For one-story construction steel requirements range from 0.6 lb. per sq. ft. of floor area for a building of 18-ft. span, to about 1.5 lb. for a 30-ft. span; 2.5 lb. for a 60-ft. span, and 5 lb. when the span reaches 100 ft.

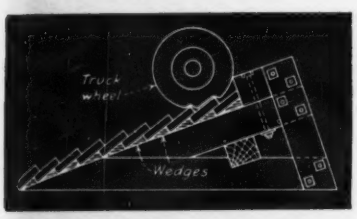
From Field and Office

WORKING PROBLEMS AND TIME-SAVING METHODS FOR ENGINEERS AND CONTRACTORS

Ramp Designed for Safety

When constructing the Arlington Heights housing project at Pittsburgh, James McHugh, contractor of Chicago, had to construct a small ramp to elevate the rear end of the transit-mix trucks to permit discharge of the concrete into a bottom-dump bucket handled by a crane. Knowing that with a smooth ramp the driver would have a hard time to hold the trucks in the elevated position, the McHugh workmen set the planks at an angle like house siding, as illustrated in the accompanying drawing, to give the tires sufficient "bite."

Built of 3 x 12-in. planks and 12 x 12-in. timbers, the ramp proved to be a safe structure to use.—W. F. LOCKHARDT, *vice president, Vacuum Concrete Inc., Philadelphia, Pa.*



Because the planks were placed as shown, truck tires obtain sufficient traction on this ramp.

Job-Made Lubricant Container Reduces Oil Waste

On a Texas construction job where several types and grades of lubricating oil were required for the various equipment used, the attempt to draw the needed oil from the several drums resulted in serious oil loss. Also the work required provision of considerable space at the field office for storing and checking the drums.

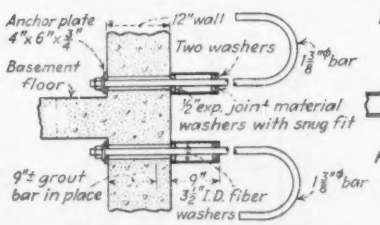
The problem of obtaining the correct oil, in the proper amount, was solved by securing six rectangular dispensing containers of the type widely used in garages and service stations, each container holding slightly more than a 50-gal. shipping drum. These container units were mounted on a heavy skid, with supporting sides and top rail of heavy pipe. The pipes were cut out to fit over and around the edges of the containers, and thus to bind them into one rigid set.

Waste and inconvenience in the use of several types of oil was eliminated on a Texas project by use of a unit container.

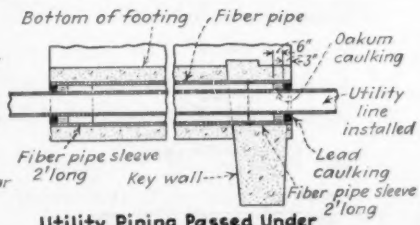
With such a unit, a drum of new oil is not brought in until the inventory, or the gauge of any container, shows there is space for its transfer. The drum is emptied and returned to the shipper without delay, and without loss.

For transfer to a new point as the work progresses, the entire skid is hoisted on a truck. The unit is moved without danger to the pumps as they are protected by the heavy pipe edging. Neither is withdrawal of any oil before loading necessary—CHARLES C. LYNDE, *Houston, Tex.*

FIBER CONDUIT SUBSTITUTED FOR CRITICAL MATERIALS



Anchor Bar Unit



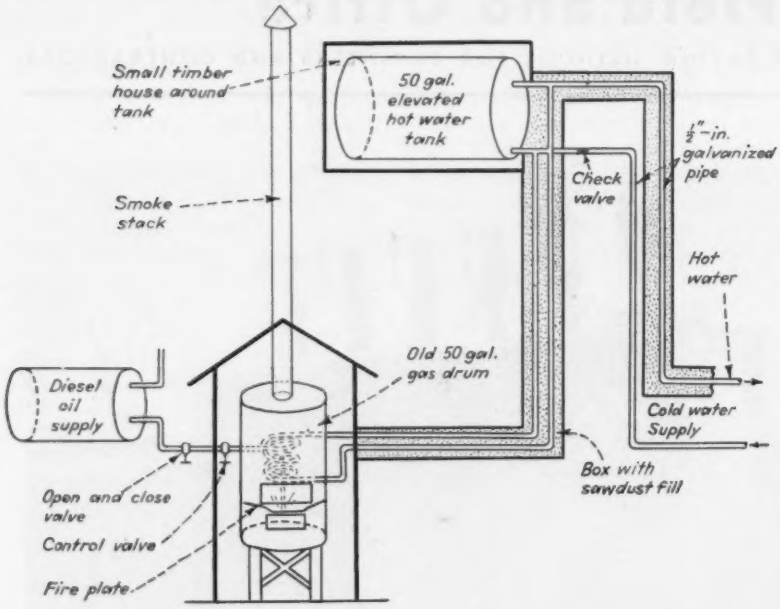
Utility Piping Passed Under Footing and Through Key

To save critical materials, fiber conduit of the type commonly used for raceways for electric cable is being used by the U. S. Army Engineers for many other uses. The drawing shows two examples of this work.

At the left is a special anchor bar unit. On this construction a second wall was built entirely around an existing building and the anchor tied the new and old walls together. The fiber conduit employed as shown permitted unequal settlement of the two walls.

How utility piping was carried under a footing and through a key by fiber pipe is shown at the right. In this case the fiber conduit acts as a sleeve to protect the utility line traversing the key of the foundation, which was that for a flood gate.—James R. Connell, vice-president, The Fibre Conduit Co., New York City.

JOB-MADE WATER HEATER AIDS MORALE OF WORKERS



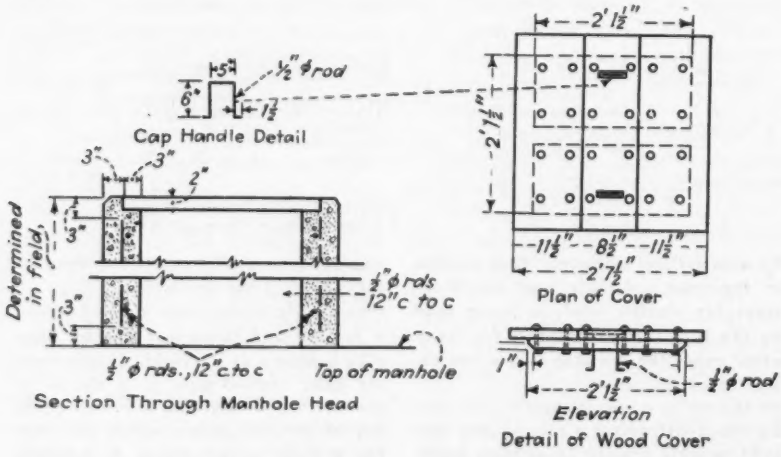
Knowing that to make hot water available with which his men could bathe upon returning from a long, hard day in the jungle, C. N. Wilzcek, area engineer for the U. S. Engineers at San Ramon, Costa Rica, on the Inter-American Highway Project, built the heater illustrated by the accompanying drawing. It heats water for about 20 men and uses 5 gal. of diesel oil weekly.
The fire is started about two o'clock in the afternoon and by five o'clock sufficient hot water is available for everyone. The fire is turned off at night.

CONCRETE MANHOLE HEADS

In building an electrical system requiring over 125,000 ft. of fiber duct encased in concrete, the saving in critical materials by careful design of about 60 manhole rings and covers was rather extensive. The design indicated in the accompanying drawing was adopted.

This design met two major aims. First, in locations of heavy traffic it may prove advisable to later replace the concrete head, which was built with 3,000-lb. concrete, and with a cast iron ring and cover. Accordingly, the head was designed so that it could be easily removed and replaced with a standard ring and cover. Secondly, in the event the traffic is not heavy, the construction is such that it can be left in place indefinitely.

The design requires a minimum of reinforcing and may be used for any type of manhole, whether concrete or brick. Also, it is adaptable for electrical, steam and sewer lines. In the interest of economy and availability of materials, the wood for the covers constructed was not impregnated.—LEO DOLKART, *chief electrical engineer, Leonard Construction Co. and James A. Munroe and Sons, Melville, R. I.*



On an electrical project large critical material savings resulted by building manholes heads and covers of concrete and wood.

Screws Fasten Steel Flange to Rubber Delivery Pipe

Reinforced rubber hose of 6-in. diameter is used at the lower elbow in the delivery pipe from the concrete gun that places lining in the Pit 5 tunnel being built in California by the Pacific Gas and Electric Co. The

Wood screws fasten steel flange to 6-in. rubber hose.

6-ft. length of rubber hose that constitutes this elbow has a steel flange at each end to be bolted to standard steel pipe flanges. A length of about ⅛ in. of the rubber hose is allowed to project inside the face of the flange to serve as a gasket where the joint is made.

The sleeve of the steel flange on the rubber pipe is about 12 in. long. A strong, tight joint is effected between sleeve and rubber by wood screws spaced 3½ in. both ways over the entire cylindrical surface of the sleeve. Around the base of the flange the screws are spaced 2 in. apart. Screw holes were countersunk and flat-headed screws were used (instead of the easier use of round-headed screws) to avoid projections. This joint is opened for clearing the line.

Don't put Johnny on the spot!

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CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

PUMPING STATION SUPERSTRUCTURE CHICAGO, ILL.

OWNER: City of Chicago, Dept. of Public Works; W. W. DeBerard, city engr.

PROJECT: Superstructure for low lift pumping station and chemical building, South District Filtration Plant at East Cheltenham Place and South Shore Drive, Chicago, Ill. Chemical building elevation, now 24-ft. above lake level, to be increased to 95-ft. Involves all necessary concrete work, masonry, roofing, glazing, structural steel, heating and plumbing, electrical work and other work required for completion of this contract.

CONDITIONS: Contractor to furnish all materials and complete work in 400 calendar days. Rail and highway transportation facilities available. Wage rates are: skilled labor, $1.70 to $1.825 per hour; and common, $1.10.

BIDS: Fourteen bids were received May 12, 1943, ranging from the low of $954,771 to $1,311,800. Engineer's estimate $1,100,000.

LIST OF BIDDERS:

1. S. N. Nielsen Co., Chicago, Ill. (low bidder) ..... $ 954,771
2. Joseph J. Duffy Co., Chicago, Ill 967,165
3. Patrick Warren Constr. Co., Chicago, Ill 968,000
4. Paschen Contractors, Chicago, Ill 984,762
5. Gust. K. Newburg Constr. Co., Chicago, Ill 1,013,950
6. W. E. O'Neil Constr. Co., Chicago Ill 1,029,000
7. J. W. Snyder Co., Chicago, Ill 1,037,206
8. Carl E. Erickson Co., Chicago, Ill 1,045,000
9. G. Kehl Sons, Chicago, Ill 1,045,850
10. William R. Goss Co., Chicago, Ill 1,051,304
11. Michuda Bros. Constr. Co., Chicago, Ill 1,109,236
12. Coath & Goss, Inc., Chicago, Ill 1,111,429
13. Michael J. McDermott & Co., Chicago, Ill 1,136,988
14. James McHugh Sons, Chicago, Ill 1,311,800

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Concrete	6,500 c.y.	$35.00	$26.00	$25.00
2. Reinforcing steel	1,250,000 lb.	.05	.05	.0525
3. Heating; including boiler room equipment and accessories	Lump Sum	107,872.00	95,000.00	100,000.00
4. Ventilation	Lump Sum	3,100.00	2,300.00	2,600.00
5. Plumbing	Lump Sum	40,682.00	41,000.00	46,000.00
6. Electrical work	Lump Sum	11,200.00	11,000.00	12,000.00
7. Masonry and other apurtenant work	Lump Sum	801,917.00	586,365.00	579,275.00

COMPLETION OF VIADUCT SEATTLE, WASH.

OWNER: Washington State Highway Dept., Olympia, Wash.; Burwell Bantz, state highway director.

PROJECT: Completion of Spokane Street Viaduct in Seattle, Wash., delayed by steel shortages until preference rating ran out. Expiration of priority rating necessitated some re-designing, and also letting of new contract. Original contract involved construction of a steel, reinforced concrete and timber overcrossing structure with concrete approaches. Approximate length of project 0.8 miles.

CONDITIONS: Contractor to furnish all materials and complete balance of project in 240 days. Rail and water transportation facilities available to city of Seattle, and highway transportation to site of work. Wage rates specified are: skilled labor, $2.00 per hour; semi-skilled, $1.50; and common, $1.10.

BIDS: Bids on original project were received December 23, 1941, and on this resumption and completion on April 20, 1943. Three bids were received on the latter, ranging from $496,169 to $615,944. Same contractor who started work was low bidder on the completion work.

LIST OF BIDDERS:

1. McRae Brothers, Seattle, Wash. (contract) $496,169
2. General Construction Co., Seattle, Wash 564,108
3. Macri Company, Seattle, Wash 615,944

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Sewer manhole with existing ring cover	Lump Sum	$200.00	$400.00	$200.00
2. Earth fill, approach ramps	2,900 c. y.	1.35	1.50	2.5
3. Cement concrete pavement, standard 14-day mix	1,575 s. y.	2.75	3.00	4.00
4. Cement conc. pavmt., std. 14-day mix	1,250 s. y.	3.00	3.40	4.00
5. Place dowel bars with caps (std.)	211 ea.	.25	.20	.20
6. Furn., place dowel bar caps	100 ea.	.25	.40	.40
7. Remove existing pavement	500 s. y.	1.25	1.50	2.00
8. Type A curbs in place	950 l. f.	.50	1.00	.75
9. Place precast white conc. curb	1,675 l. f.	.80	.40	.75
10. Furn., place precast white conc. curb	75 l. f.	2.80	4.00	1.40
11. Extra for furn. H.E.S. cement in place of standard port. cement	625 bbl.	.80	1.00	1.00
12. Special excavation	1,750 c. y.	4.00	4.00	4.00
13. Structure excavation	1,100 c. y.	3.50	8.00	10.00
14. Furn. untreated timber piling	4,700 l. f.	.28	.30	.40
15. Furn. creosoted timber piling	4,800 l. f.	.16	.70	.75
16. Drive untreated timber piles	119 ea.	13.00	20.00	30.00
17. Drive treated timber piles	130 ea.	13.00	20.00	30.00
18. Class A concrete (struct. deck steel span)	6,450 c. y.	29.00	34.00	36.00
19. Class A conc. (deck timber spans)	400 c. y.	38.00	34.00	32.00
20. Class B concrete	70 c. y.	29.00	34.00	30.00
21. Class F concrete	200 c. y.	29.00	34.00	30.00
22. Clean steel reinf. bars already placed	Lump Sum	452.00	100.00	600.00
23. Furn., place steel reinf. bars	1,885,000 lb.	.05	.05	.05
24. Clean, place steel reinf. bars	75,000 lb.	.05	.04	.05
25. Furn., fabricate, erect struct. steel	1,400,000 lb.	.085	.10	.10
26. Fabricate and erect struct. steel	184,000 lb.	.05	.055	.055
27. Erect structural steel	8,400 lb.	.035	.03	.03
28. Paint portions of exist. structures	Lump Sum	5,500.00	8,000.00	10,000.00
29. Erect cast steel	17,830 lb.	.02	.03	.10
30. Furn., install forged steel	4,500 lb.	.25	.50	.40
31. Installing forged steel	2,700 lb.	.10	.05	.20
32. Installing bridge drains	44 ea.	7.50	7.00	20.00
33. Downspouts	Lump Sum	2,650.00	4,800.00	2,200.00
34. Timber railings	7,515 l. f.	.52	.35	.50
35. Trolley protection and grd. fence	Lump Sum	1,600.00	800.00	1,858.50
36. Locomotive blast protection	Lump Sum	706.00	800.00	3,000.00
37. Lighting system, complete	Lump Sum	8,846.00	8,600.00	12,000.00
38. Remove temporary curb, barricades, rails	Lump Sum	1,965.00	3,000.00	3,000.00
39. Clean existing anchor bolt holes	(Force Acct.)	100.00	100.00	100.00
40. Reconditioning falsework, forms	(Force Acct.)	500.00	500.00	500.00

BULKHEAD, SEATTLE, WASH.

OWNER: City of Seattle, Washington; C. L. Wartelle, city engineer.

PROJECT: Construction of riprap bulkhead along Seaview Ave., Seattle, fronting on Shilshole Bay. Project involves furnishing and placing 8,300 cubic yards of rock riprap.

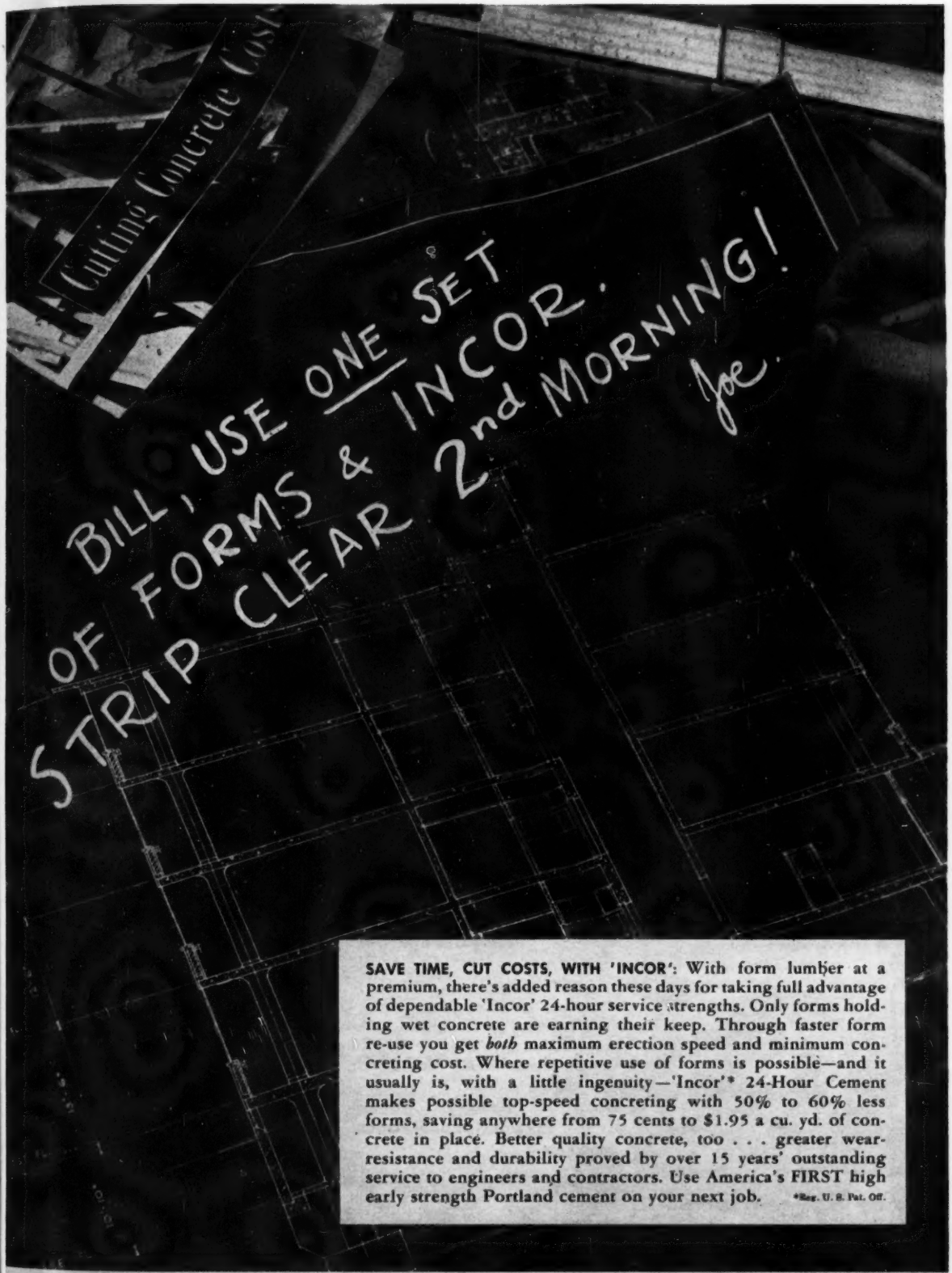
CONDITIONS: Contractor to furnish all material, and haul from nearby dock to site of work. Completion time 120 days. Wage rates are: skilled labor, $2.00 per hr.; semi-skilled, $1.50; and common, $1.10.

BIDS: Three bids were received May 13, 1943, ranging from the contract low of $31,955 to $89,806.

LIST OF BIDDERS:

1. General Construction Co., Seattle, Wash. (contract) $31,955
2. L. Romano Engineering Corp., Seattle, Wash 40,255
3. Puget Sound Bridge & Dredging Co., Seattle, Wash 89,806

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Rock riprap	8,300 c. y.	$3.85	$4.85	$10.00



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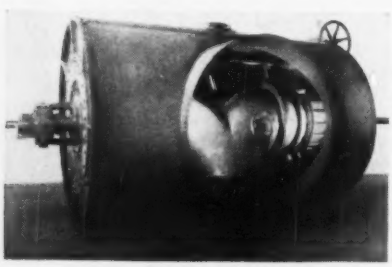
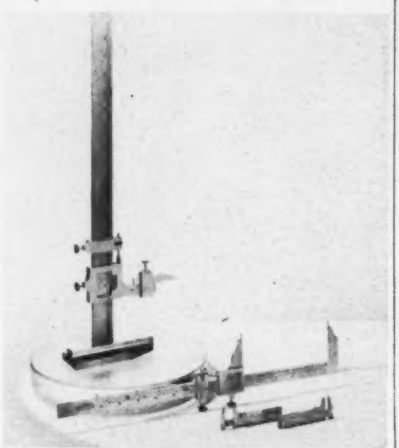
Moisture Resistant Tracing Cloth

The manufacturer has recently developed a new improved white pencil tracing cloth. One of the outstanding features of this article is said to be that it is moisture-resistant on both sides. The manufacturers claim that this feature, plus the glass-like transparency of the material assures prints that are etching sharp, making possible blueprints with a rich, uniform background and sharp white detail.—*The Frederick Post Co., Box 803, Chicago, Ill.*



Specially Designed Water Wheels

The illustration above shows a setting for two 25-in. water wheels on a depressed top cast iron T-center in a new boiler-iron flume. The installation was made for a textile mill in Massachusetts to meet its particular needs but shows why the design of the setting and flume, as well as the casing and water wheel, can be important factors in the efficiency of a water power development. According to the manufacturer's engineers, it is often possible to redesign a flume or a setting to give greatly increased power. They claim that in nearly every water wheel installation that is 10 or 15 years old, a saving of as high as 30 or 40 percent can be made by modernization.—*Rodney Hunt Machine Co., Orange, Mass.*



Height Gage

One of the latest precision tools on the market is an 18-in. Vernier height gage. This tool has all working surfaces lapped and its accuracy is attested by a checking laboratory. It is designed for accurate layout work.—*McGrath St. Paul Co., St. Paul, Minn.*

Plywood Panel Door

To meet the urgent wartime demands for large doors for airplane, blimp and dirigible hangars, PT boat plants, aircraft plants and for other industrial purposes, this company has designed a hollow plywood panel door. The panels are prefabricated and assembled so that they can slide either vertically or horizontally. They are constructed of standard width plywood which is pressure glued to dressed wood framework. The plywood surface is scarfed, providing

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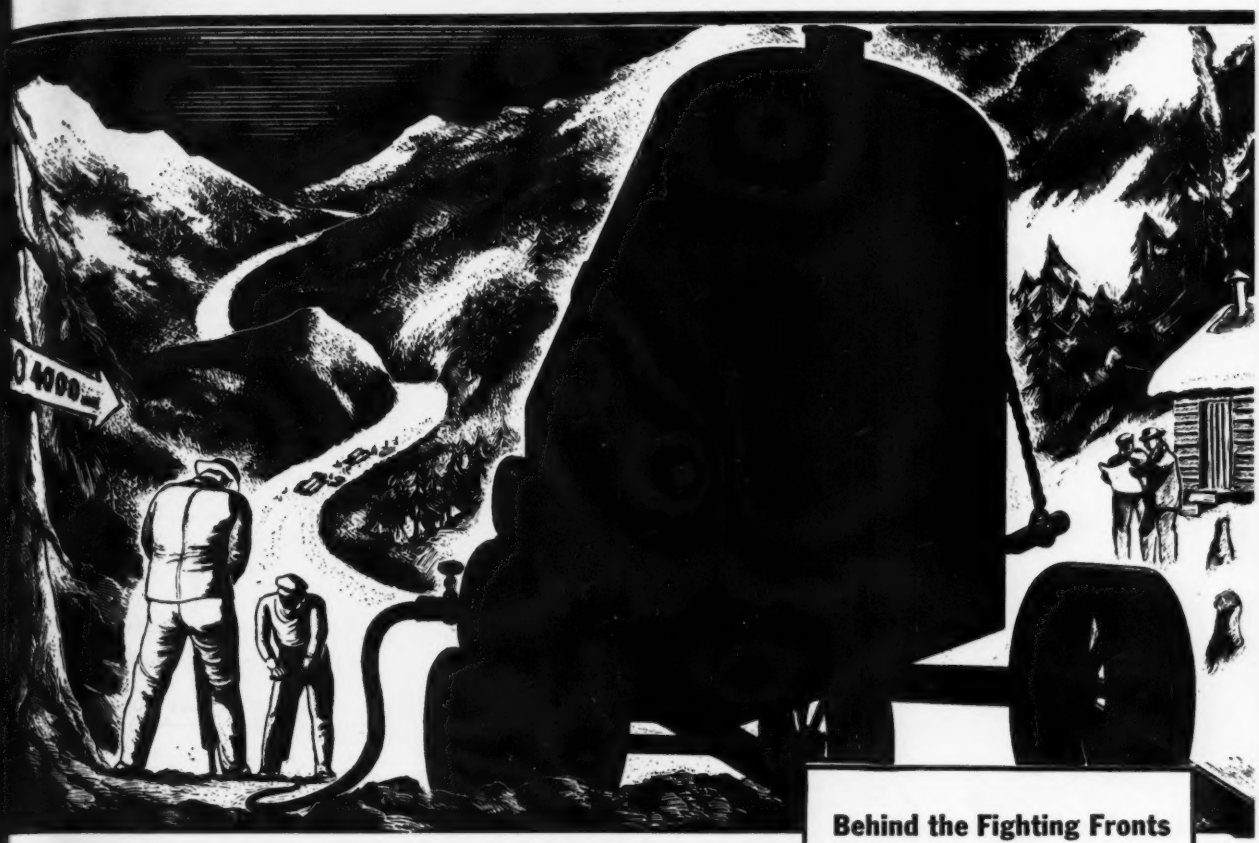
Hartford — The Holmes-Talcott Company
GEORGIA
Atlanta — Tractor & Machinery Co., Inc.
ILLINOIS — Chicago— Kennedy-Cochran Co.
INDIANA
Indianapolis — Reid-Holcomb Company
IOWA— Des Moines — Electrical Eng. & Constr. Co.
Davenport — Industrial Engineering Equipment Co.
KENTUCKY — Harlan — Hall Equipment Sales
Louisville—Williams Tractor Company
LOUISIANA
New Orleans—Wm. F. Surgi Equipment Company
MAINE — Ellsworth — Murray Machinery Co.
MARYLAND
Baltimore — D. C. Elphinstone, Inc.
MASSACHUSETTS
Boston — P. I. Perkins Company
Cambridge — W. W. Field & Son, Inc.
Springfield — The Holmes-Talcott Company
MICHIGAN
Detroit — W. H. Anderson Company, Inc.
MINNESOTA
Hibbing—Arrowhead Equipment & Supply Co.
Minneapolis — The George T. Ryan Company
MISSOURI
Kansas City — Machinery & Supplies Company
MONTANA— Helena — Caird Engineering Works
NEW HAMPSHIRE
West Lebanon—P. I. Perkins Company
NEW JERSEY
Hillside—P. A. Drobach
North Bergen—American Air Compressor Corp.
NEW MEXICO
Albuquerque — The Harry Cornelius Company
NEW YORK
Albany — Larkin Equipment Company
Albany—T. Southworth Tractor & Machy. Co., Inc.
Menands
Binghamton — MacDougall Equipment Co.
Buffalo — Dow & Company, Inc.
Corona, L. I. — The Jaeger-Lembo Machine Corp.
Middleton — S. T. Randall, Inc.
New York—Hubbard & Floyd, Inc.
Olean — Freeborn Equipment Company
Oneonta — L. P. Butts, Inc.
Syracuse — Harrod Equipment Company
NORTH CAROLINA
Durham — Constructors Supply Company, Inc.
OHIO — Cincinnati — The Finn Equipment Company
Cleveland — Gibson-Stewart Company
Marietta — Northwest Supply & Equipment Co.
Toledo — M. W. Kilcorse & Company
OKLAHOMA
Oklahoma City — Townsco Equipment Co.
OREGON
Portland — Andrews Equipment Service
PENNSYLVANIA
Easton — Sears & Bowers
Harrisburg — N. A. Coulter
Oil City — Freeborn Equipment Company
Philadelphia — Metalweld, Inc.
Pittsburgh — John McC. Latimer Company
Wilkes-Barre — Ensminger & Company
SOUTH CAROLINA
Columbia — Bell-Lott Road Machinery Co.
SOUTH DAKOTA
Sioux Falls — Empire Equipment Co.
TENNESSEE
Chattanooga — James Supply Company
Knoxville—Wilson-Weesner-Wilkinson Co.
Memphis — Tri-State Equipment Company
TEXAS — Dallas — Shaw Equipment Company
Houston — McCall Tractor & Equipment Co.
San Antonio — Patten Machinery Company
VIRGINIA
Richmond — Highway Machinery & Supply Co.
WASHINGTON
Seattle — Star Machinery Company
Spokane—Andrews Equipment Service
WEST VIRGINIA
Fairmont — Interstate Engineers & Constructors
WISCONSIN
Eau Claire — Bradford Machinery Company
Green Bay — Nelson Machinery Company
Madison — Western Equipment Company
WYOMING
Cheyenne — Wilson Equipment & Supply Co.

Get more WORTH from air with WORTHINGTON

Buy Blue Brutes

Worthington Pump and Machinery Corp.

AIR-POWER NORTH TO TOKIO...



Ask them along the road to Fairbanks what Blue Brutes can do. The builders wanted rock-blasting air-power they could count on for the toughest construction job since Panama. They took Worthington Blue Brute Compressors and Air Tools in "uniforms" of olive drab.‡

Over 1200 miles of boggy marshland, swamp-traps, axle-busting mountain peaks, through mud and ice, they helped blast the Alcan highway through. Alaska's, Tokio's fate hangs by that road-thread. Blue Brutes stood action's test.

Worthington Blue Brute Compressors . . . portable and semi-portable . . . gasoline, diesel and electric driven . . . have staying power in a pinch because like road-trained champion heavy-weights they're gentle-breathing. The improved Feather* Valve stops gulping "back talk", when lesser breeds whine for the tool shed. *They deliver more air,* steadily, per power-dollar.

Smooth, easy-handling strength makes Worthington Rock Drills and Air Tools also your best "brutes" for fast, historic construction. Sturdy, quality-strong, *they use less air.* Your test will prove it.

‡Blue Brute Compressors and Air Tools are painted olive drab for the Army. *Reg. U. S. Pat. Off.

Behind the Fighting Fronts with

BLUE BRUTES

A famous West Coast shipbuilder, who recently broke all records building Liberty Ships, buys Blue Brutes to provide air-power for a multitude of operations, 24 hours a day. Blue Brutes are performing like this in hundreds of Army camps, Navy yards, air bases and ordnance plants throughout the country. Your nearest distributor is listed on page 100.

Get more WORTH from air with WORTHINGTON

BUY BLUE BRUTES

pressors from 60 to 500 cu. ft. capacity in mounted rail all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTHINGTON

Worthington Pump and Machinery Corporation, Harrison, N. J. Holyoke Compressor and Air Tool Department, Holyoke, Massachusetts

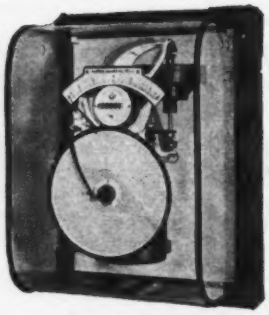
With all replacement parts on the "critical list," the truck owner appreciates the extra life which Fuller's correct design, precision-cut and properly mated gears assure. For example, Julius Gaussoin of the Silver Eagle Company says: "We have one unit which has gone 390,000 miles. The only service given to the Fuller Transmission has been to remove the cover for regular inspection and make sure the gears were properly lubricated." That's why we say quiet running means longer wear-life . . . less need for parts replacement.

FULLER MANUFACTURING COMPANY . . . . . KALAMAZOO, MICHIGAN

SPARLING
MAIN-LINE WATER METERS
THE MASTER METERS for SERVICE and SATISFACTION

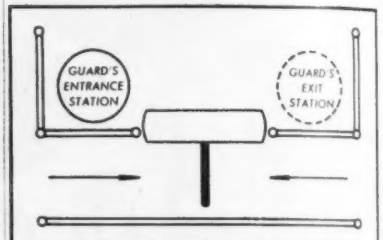
SPARLING

Box 3277 Terminal Annex 54 ..... LOS ANGELES
3104 South Michigan Ave. 16 ..... CHICAGO
622 Broadway 2 ..... CINCINNATI
101 Park Avenue 17 ..... NEW YORK
6 Beacon Street ..... BOSTON



Totalizer—Indicator—Recorder, Type No. 216
May we send you Bulletin No. 308?

one continuous piece of plywood the full length of the prefabricated panel. In order to join the sections in the field, the dressed wood framework is also scarfed. This joining is accomplished by the use of resin glue under bolted pressure and then reinforced with plywood battens also glued in place. All exposed ends of sections are finished off with continuous dressed wood framing members the thickness of internal framework, plus the thickness of plywood, thereby sealing the edges. The horizontal sections are framed vertically and the vertical doors are framed horizontally.—*The Peelle Co., 47 Stewart Ave., Brooklyn, N. Y.*



Turnstile With "*Self Positioning*" Arms
Barrier arm ALWAYS stops automatically in RIGHT barrier position

SKETCH "A"

Plant Turnstiles

A self positioning arm makes this turnstile automatic in action. The advantages are said to be: (1) The continuous passage of authorized workers, (2) better examination of the workers by the guard whose attention is not distracted by having to concern himself with the positioning of elemental turnstile arms, (3) speed, because the turnstile is always ready and waiting for the next person to pass, (4) safety, because the self positioning arms always stop in correct passage barring position.—*Perey Turnstile Co., 101 Park Ave., New York, N. Y.*

Worm Gears

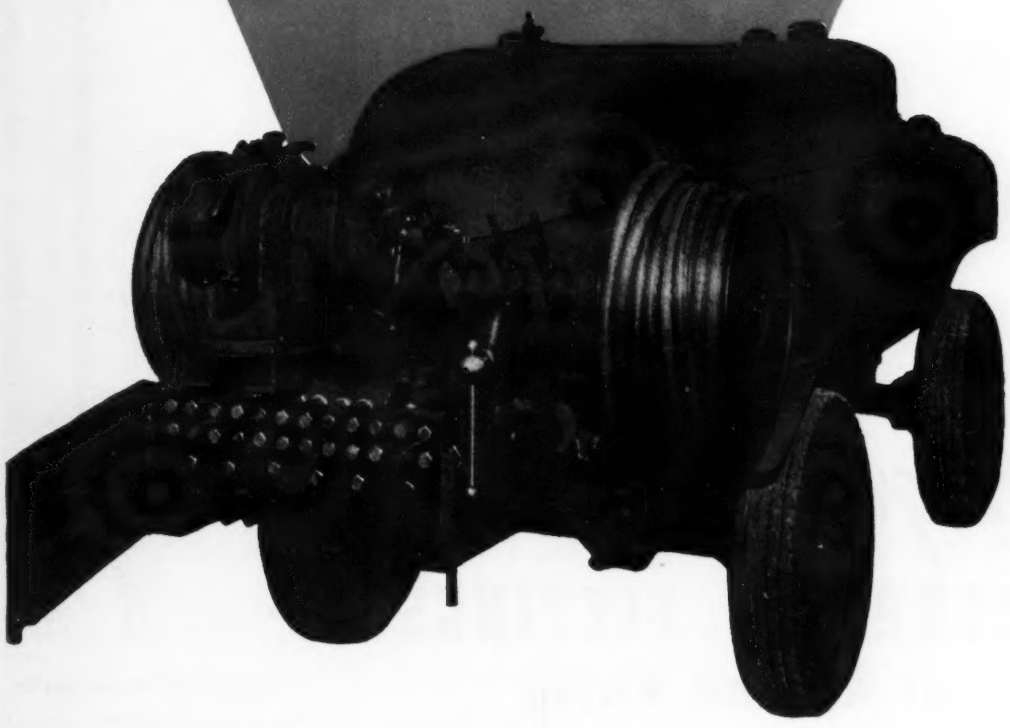
These gears are intended particularly for the operation of low-power machinery, such as small mixers, dryers, automatic furnaces and ovens, conveyors and elevators, mechanical stokers, etc. The lower ratios can be used as speed increasing gears where the maximum worm speed does not exceed 1,750 rpm.—*De-Laval Steam Turbine Co., Trenton, N. J.*

Wage-Hour Calculation

Almost any wage-hour calculation required for a payroll is prefigured and the answer already printed with larger than typewriter type in this new device which gives hourly rates ranging from 30 cents

DRILLMASTER

COMPRESSOR & TOOLS UNIT



HERE'S A "PACKAGE" — designed by Schramm for the many jobs required on both construction and maintenance that call for a portable compressor and the tools to put this power to work . . . No matter how distant or how inaccessible your location is—one order, one shipment brings you this compact, ready-to-work power plant and tools.

They're All in This Complete Unit

A Model 105 Schramm Compressor with special racks and tool boxes with fixed locations for each tool and accessory, so that most any compressor requirement that arises can be met and handled.

Equipment includes: Double hose reels, live air type, each equipped with three 50 ft. lengths of ¾" air hose. Air receiver with three extra outlets, equipped with quick action valves, hose couplings and 3½" vise for flat or pipe work, on swivel base. Tools recommended depend entirely on user's requirements and the ability of tool manufacturers to furnish them under existing conditions.

Schramm Model 105 is the answer to manpower shortage and the nuisance of miscellaneous purchases. Your priority assures quick delivery. So write now for complete details and prices contained in Bulletin C-9.

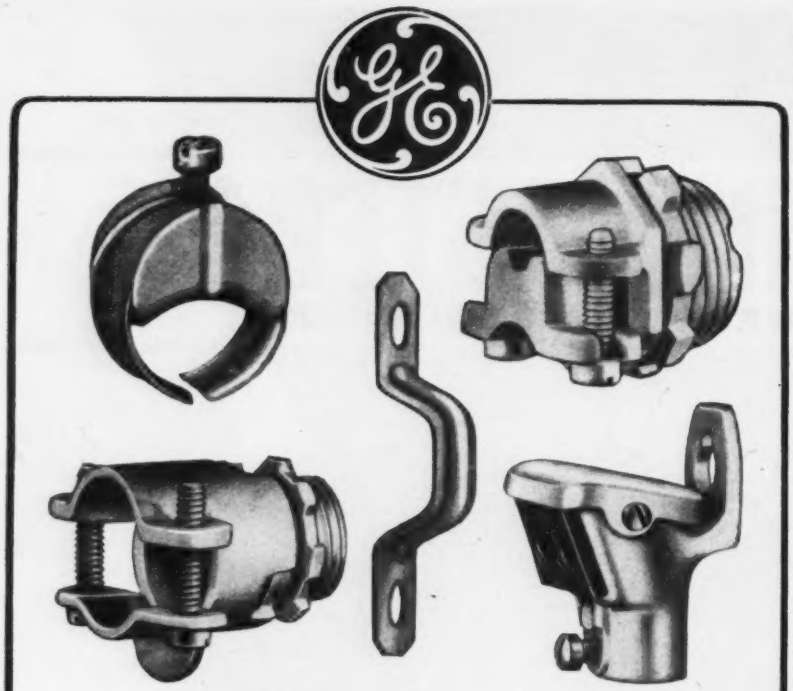
★ ★ ★

SCHRAMM

INCORPORATED

THE COMPRESSOR PEOPLE

WEST CHESTER, PENNA.



A few of the many G-E fittings available

High Quality

ELECTRICAL FITTINGS

For Wartime Wiring

All of the electrical fittings needed on wartime wiring jobs can be found in the high quality General Electric line.* There are over 450 different items available—all of them particularly suited for today's needs.

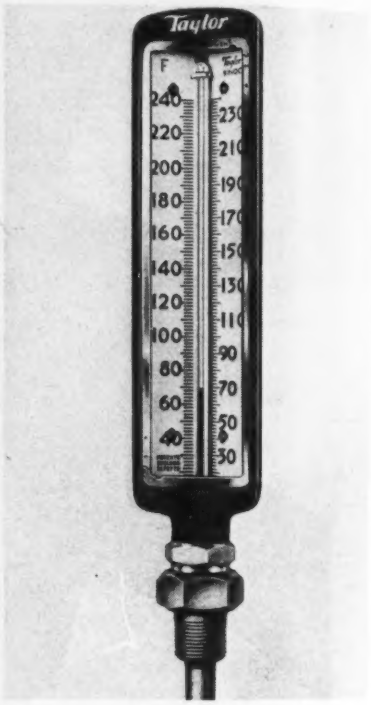
For instance, there are fittings for BraidX, the non-metallic sheathed cable being used in factories and in war housing; there are connectors for factory bus drop cable; there are fittings for use with service entrance cable; and there are fittings for basket weave shielded cables and other cables. There are fittings for all raceways such as rigid conduit, thin-wall conduit, etc.

For further information, see the nearest G-E Merchandise Distributor or write to Section C732-113, Appliance and Merchandise Department, General Electric Co., Bridgeport, Conn.

*In keeping with WPB cadmium limitations, G-E fittings have bonderized non-metallic finish

GENERAL ELECTRIC

to $1.30 in half cent steps and from $1.30 to $2.12½ in 2½ cent steps. One simply sets a patented slide to a particular rate and reads off straight time, overtime after 40 hours, and the total; straight time, extra time after 40 hours and total; straight time from one to 64 hours; straight time with overtime beginning at any hour, on a daily or weekly basis. Included in the device are rates on fractions of hours in tenths or quarters and the standard Victory Tax schedule.—*The Wage-Master Co., 20 N. Wacker Drive, Chicago, Ill.*

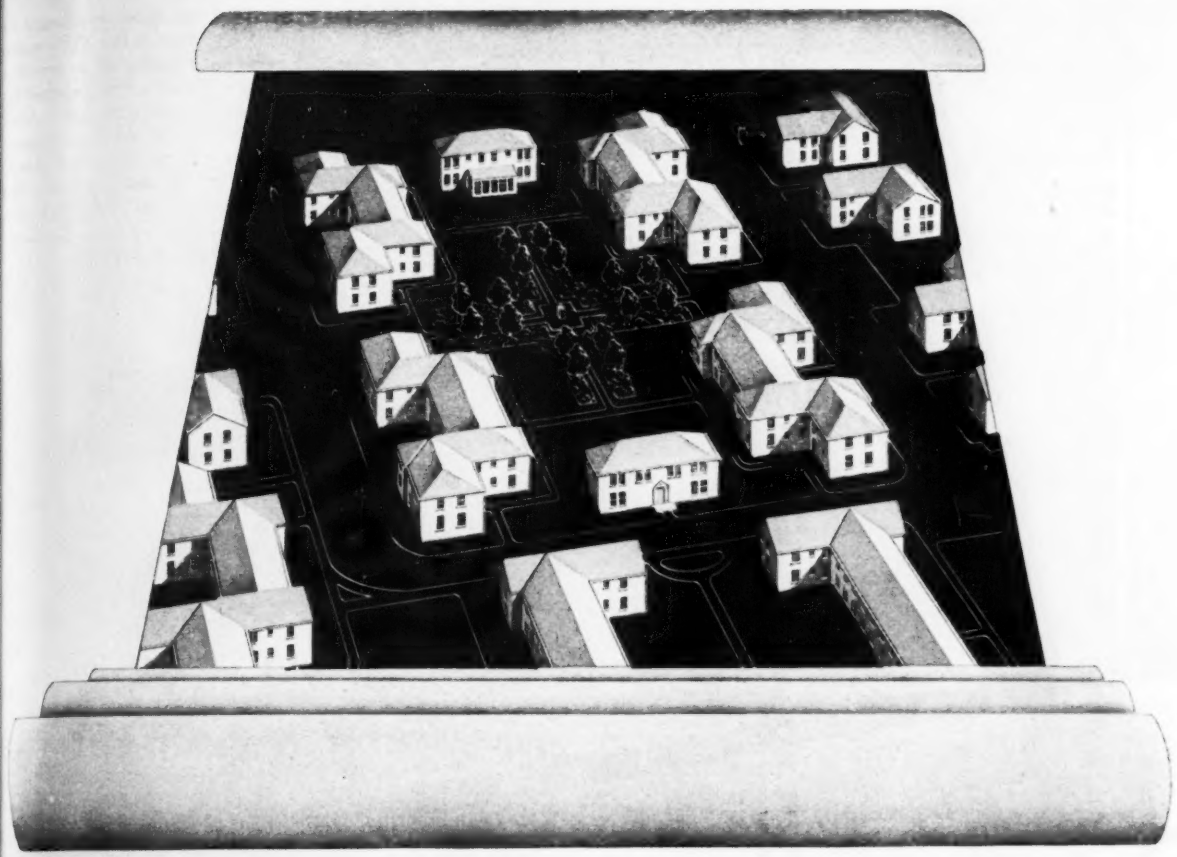


Industrial Thermometer

Moved by the desire to save critical metals in wartime, the manufacturers have designed and tested a one-piece industrial thermometer. The case is shallower than the usual form. This makes it possible to see the mercury column through a wider angle of vision. The chromium-plated bezel fits snugly into the grooved case in such a way as to hold the thick glass front securely against four tension springs. These springs are fastened securely under the scale by shakeproof screws. This construction results in a dustproof, rattleproof and practically fumeproof thermometer. It can withstand vibration and severe shocks.—*Taylor Instrument Companies, Rochester, N. Y.*

Electric Cranes

The use of alternating current for electric crane operation is not new, but in the past it was usually necessary to employ a mechanical load brake and the



Progress That Is As Practical As Steel Itself

No rapturous flight of fancy is essential to the concept of tomorrow's building designs. Progress will involve the application of improved methods, materials and practices to time-honored forms, while "inspired architecture" may well be a matter of dollars-and-cents value. The prospect is no less exciting for this.

Stran-Steel engineered systems are practical, flexible, adaptable to varied requirements. They were applied successfully to housing projects of many types before the war, and are now meeting military building requirements for the armed forces. Stran-Steel is well qualified to serve the post-war building industry.

STRAN STEEL

DIVISION OF GREAT LAKES STEEL CORPORATION
1130 PENOBSCOT BUILDING, DETROIT, MICHIGAN

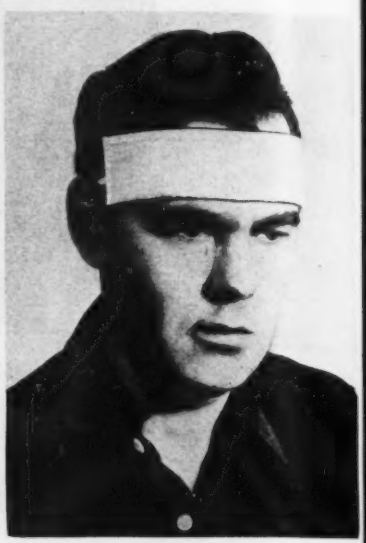
UNIT OF NATIONAL STEEL CORPORATION

for Excellence

Another flag flies over the Mueller factories here in Decatur today—the coveted Army-Navy Production Award. It was presented to the men and women of the Mueller organization for "fine achievement in the production of war materials". While we take pride in this high honor, we realize that the production records established were made only to be broken. We must continue to produce even more of the weapons of war in order that we and our Allies may achieve the final victory. To this task we will continue to give our efforts, our skill and our resources.

MUELLER CO. DECATUR, ILL.
FOUNDED 1857

performance of the crane was limited by the efficiency of that brake. This manufacturer has now perfected a controller that is claimed to set a new standard for the operation of electric cranes on alternating current. It provides dynamic lowering over five stable speed points; accurate inching for spotting loads; and timed acceleration in both directions from a standard 5-speed master.—*Cutler-Hammer, Inc., Milwaukee, Wis.*



Cool Sweat Band

This new sweat band gives employees greater comfort for hot weather work. The outside covering is of an insoluble material which assures cool, non-irritating forehead contact. Vision is impaired and efficiency hindered by perspiration running into the eyes of workers, but this band is said to absorb perspiration immediately on contact.—*Aldine Paper Co., 373–4th Ave., New York, N. Y.*

Round Ventilators for Roofs

Among the special features claimed for this new ventilator are the following: Full stated dimensions, inside measurement for base ring of each size ventilator; stack height equal to stack diameter, which facilitates air flow through the vent head; wind baffle designed to prevent wind from entering accelerator band; accelerator band of oversize diameter and height. Weather baffle, giving maximum unobstructed ventilator exhaust and assuring weather-tight protection; cone of adequate pitch for drainage, and diameter to assure weathertight ventilator under the most severe conditions; frame structure designed for wind of 80 mph.—*American Steel Band Co., Pittsburgh, Pa.*

IN TUESDAY... OUT WEDNESDAY

SERVICE in a hurry — that's what you get when your Allis-Chalmers dealer repairs or rebuilds your equipment. A recent example is this six-year-old Model WM, owned by J. A. Krusell, Waukesha, Wis. Hauled into the shop of an A-C dealer, Drott Tractor Company, for repairs one day . . . it was back rushing essential work the next! In less than a day's time a new gear, pinion and bearings were placed in a final drive . . . a steering clutch was rebuilt . . . new leaves were installed in the stabilizer spring . . . old-type rollers were replaced with a set of the new Positive-Seal truck wheels that require lubrication only once in 200 hours.

Busy as he is on war jobs, your Allis-Chalmers dealer is still taking good care of essential civilian customers. Quick to change over to meet war requirements, he is set up to handle a large volume of work. Jobs go through in production line fashion — yet each is carefully supervised and handled. His staff of factory-trained mechanics know exactly what to do and how to do it — and have the right type tools to get it done in minimum time.

Next time you want a service job handled in a hurry, done right and at small cost . . . call your Allis-Chalmers dealer. You'll have your unit back on the job in no time—with many more hours of efficient performance added.

ENLIST WITH THE "SEABEES"

SEABEES

INQUIRE AT ANY U.S. NAVY RECRUITING STATION

U.S. NAVY BUREAU OF YARDS AND DOCKS

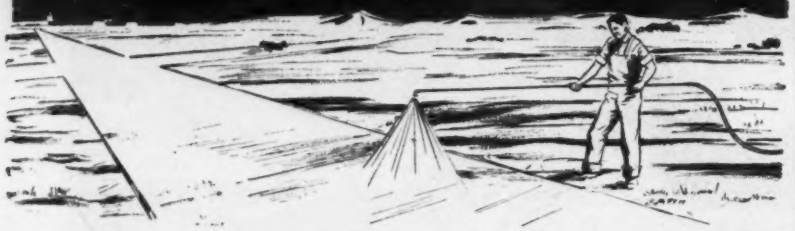
ARMY-NAVY E

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE, U.S.A.

KLEARCURE

CONCRETE CURING COMPOUND



for Speed, Economy & Results

KLEARCURE

May be applied with simple apparatus.

★

Dries fast, protects surface from rainfall and early moisture loss.

★

Contains a sufficient percentage of correct type of solids to obtain a tough impervious membrane with high moisture retention qualities, not a high percentage of inefficient solids.

★

Covers sufficient area to make its use economical to the contractor and beneficial to the job.

★

Is not affected by temperature changes and may be used at any temperature at which concrete can be placed.

KLEARCURE sprayed on concrete immediately after finishing assures harder, stronger and tougher concrete because of the high moisture retention obtained by this simple method of curing.

KLEARCURE is produced by Engineers who have been continually manufacturing membrane curing compounds for the past 10 years.

KLEARCURE has been used to cure millions of square yards of concrete on Federal, State and other Defense Projects.

a product of

WALL PRODUCTS, INC.

Manufacturers — *Engineers*

Foot of Centre St. — **Newark 2, N. J.**

Manufacturers of MORENE and other finishing materials.

Ask Your Dealer or Write Direct

Do it the easiest and best way with

KLEARCURE

DRILLING CONTRACTORS

DIAMOND AND SHOT CORE BORINGS—DRY SAMPLE BORINGS

•

Foundation Testing for Bridges, Dams and All Heavy Structures

Also

Manufacturers of Diamond and Shot Core Drills, Accessories and Equipment

•

SPRAGUE & HENWOOD, Inc.

SCRANTON, PA. Dept. E U. S. A.

MITCO

OPEN STEEL FLOORING

Pressure Formed

90% Open Area

Easy to Install

Hendrick Manufacturing Company

45 Dundaff Street, Carbondale, Pa.

MANUFACTURERS' ACTIVITIES

THE SULLIVAN MACHINERY CO., Michigan City, Ind., announces that O. J. Neslage has been appointed general sales manager. Mr. Neslage has an extensive background in the application of all Sullivan equipment as the result of many years of experience with the company. He has served as manager of the company's Mexico City, Joplin, Mo., Salt Lake City, Utah, and New York territories, which gives him a thorough knowledge of the mining, oil, construction and industrial fields. J. N. Rolston has been appointed assistant general sales manager. Mr. Rolston has had 13 years experience with the company, including five years as assistant general manager of the company's Canadian subsidiary. JOHN W. HADDOCK, vice president in charge of engineering and sales, has resigned to become president of the Farrel-Birmingham Co. of Ansonia, Conn. Mr. Haddock, during his association of more than 20 years with Sullivan, advanced progressively from an apprentice to vice president.

AT THE CLOSE of the day shift recently, 42 carloads of men and women from Standard Steel Corp., Los Angeles, Calif., lined up and travelled to the Red Cross blood bank. Credit for this mass contribution goes to C. M. Delmar, welding foreman, who states that every individual able to fulfill the Red Cross qualifications was represented. By request of the personnel, the trip was scheduled for after hours, thus permitting no lost time on the production lines fabricating plate steel into implements of war. This company has a 100 percent sign up for investment of 10 percent of wages in war bonds.

JOHN MEYER, secretary of Sauerman Bros., Inc., died in Chicago recently at the age of 46. Mr. Meyer was born in Chicago and was engaged in railroad construction and engineering work in that city before joining the Sauerman organization as production manager in 1929. He was elected secretary of the company in 1942.

AT COLUMBIA UNIVERSITY'S 189th commencement exercises on June 1, the honorary degree of Doctor of Science was conferred upon John Van Nostrand Dorr, president of the Dorr Co., 570 Lexington Ave., New York City, in recognition of his contributions to metallurgical, sanitary and chemical engineering as an engineer, inventor and administrator. The

ation of award honored Mr. Dorr's etime of work in engineering as having en ". . . of exceptional service to the merican people." In no field is this tter exemplified than that of sanitary gineering, where processes and equipent founded on his basic inventions conbute directly to the health and well ing of 50 million persons by modern ethods of sewage and water treatment.

CHARLES L. BRANSFORD, former manger of Republic Steel Corp. operations the Birmingham, Ala., district, died ne 11, at 55. Mr. Bransford, who retired Republic manager in September, 1941, as later with the Ordnance Department Birmingham. More recently he had gaged in the construction of blast furaces and a steel plant of the Lone Star eel Co. at Daingerfield, Tex.

MORTON R. HUNTER, president of the unter Tractor & Machinery Co. of Milaukee, Wis., and a former president of e Associated Equipment Distributors, s been appointed a member of the Used onstruction Machinery Industry Adsory Committee by the War Production oard.

BERRY BREVIK, who has been field engineer for the Portland Cement Associaon in the Milwaukee area for the past years, has been transferred to Appleton, Wis., where he will carry on e activities of the association in northstern Wisconsin.

TO MAKE THE EMPLOYEES feel that ey are more a part of the war program e Marmon-Herrington Co. of Indianapis, Ind., has substituted bugle calls for histles at change of shifts and at meal e. The plant streets and thoroughres have been designated with patriotic mes. The program was started with remonies conducted by a detachment soldiers from nearby Fort Benjamin arrison.

WILLIAM G. MOORE, JR., has been apointed assistant vice-president and New rk sales representative of the Keyne Wood Preserving Co., Inc., Philaphia, Pa.

ANNOUNCEMENT was recently made of e appointment of A. E. Bedell as chief gineer of Graver Tank & Mfg. Co., c., East Chicago, Ind. Mr. Bedell will in charge of all engineering and delopment for all divisions of the comny.

THE EXECUTIVE OFFICES of Mack ucks, Inc. have moved from the Long land City plant to the Empire State ilding, New York City.

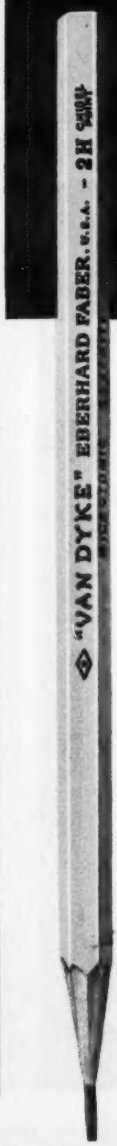
THE GRIFFIN WELLPOINT CORP. of New rk has announced the opening of a

IF YOU CHISEL POINT YOUR PENCILS

SEND THIS COUPON TO
EBERHARD FABER PENCIL CO.
37 Greenpoint Ave., Brooklyn, N.Y.

Please send me, for free testing purposes, a MICROTOMIC "VAN DYKE" PENCIL with CHISEL POINT LEAD in _____ degree (choice of 2H—4H—6H—HB—2B or 4B).

Name _____
Position _____
Business address _____



20% MORE LINE PRODUCTION BETWEEN SHARPENINGS

In addition to round leads, MICROTOMIC "VAN DYKE" Drawing Pencils are made with flat, rectangular-shaped leads for quicker and easier chisel pointing.

"CHISEL POINT LEADS" are ⅕ greater in their long dimension than the round lead of the same degree. When sharpened there is 20% more lead at the point of wear. Lines of unvarying width are produced 20% longer. Time out for repointing is 20% less frequent . . . And HI-DENSITY MICROTOMIC Leads have the advantage of always producing more opaque lines and sharper, clearer blueprints.

MICROTOMIC
VAN DYKE
Drawing Pencils

THE EBERHARD FABER DRAWING PENCIL WITH THE HI-DENSITY MICROTOMIC LEAD

"Sub Sighted" DEMANDS QUICK ACTION!

Civilian boats at war are "poison" to lurking subs. Two-way radios, with batteries kept charged by Briggs & Stratton powered generators, flash signals that summon warships or planes for "the kill." One more service stripe for rugged, dependable Briggs & Stratton gasoline engines. Hundreds of thousands are now serving our armed forces through many standard and special applications.

To prevent unnecessary repairs and to save critical materials needed for war uses, it is vital that all Briggs & Stratton 4-cycle, air-cooled gasoline engine users (both military and civilian) provide systematic care to insure maximum efficiency and longer service.

Proper lubrication with the right oil is the No. 1 "must" of the 4-point Service Program which includes periodical inspection—keeping engines clean — and always properly adjusted . . . Keep your engines in top condition. Your nearest dealer or Briggs & Stratton Service Station will gladly help you.

BRIGGS & STRATTON CORP.
MILWAUKEE 1, WIS., U. S. A.

4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

Invest In Freedom—BUY WAR BONDS

southern branch office and warehouse at 633 North Myrtle Ave., Jacksonville, Fla. William J. Carr is the manager.

SUMNER C. WILLIS, New York district superintendent for the H. K. Ferguson Co., industrial engineers and builders, has resigned to become associated with the National Co., radio engineers and manufacturers, of Malden, Mass.

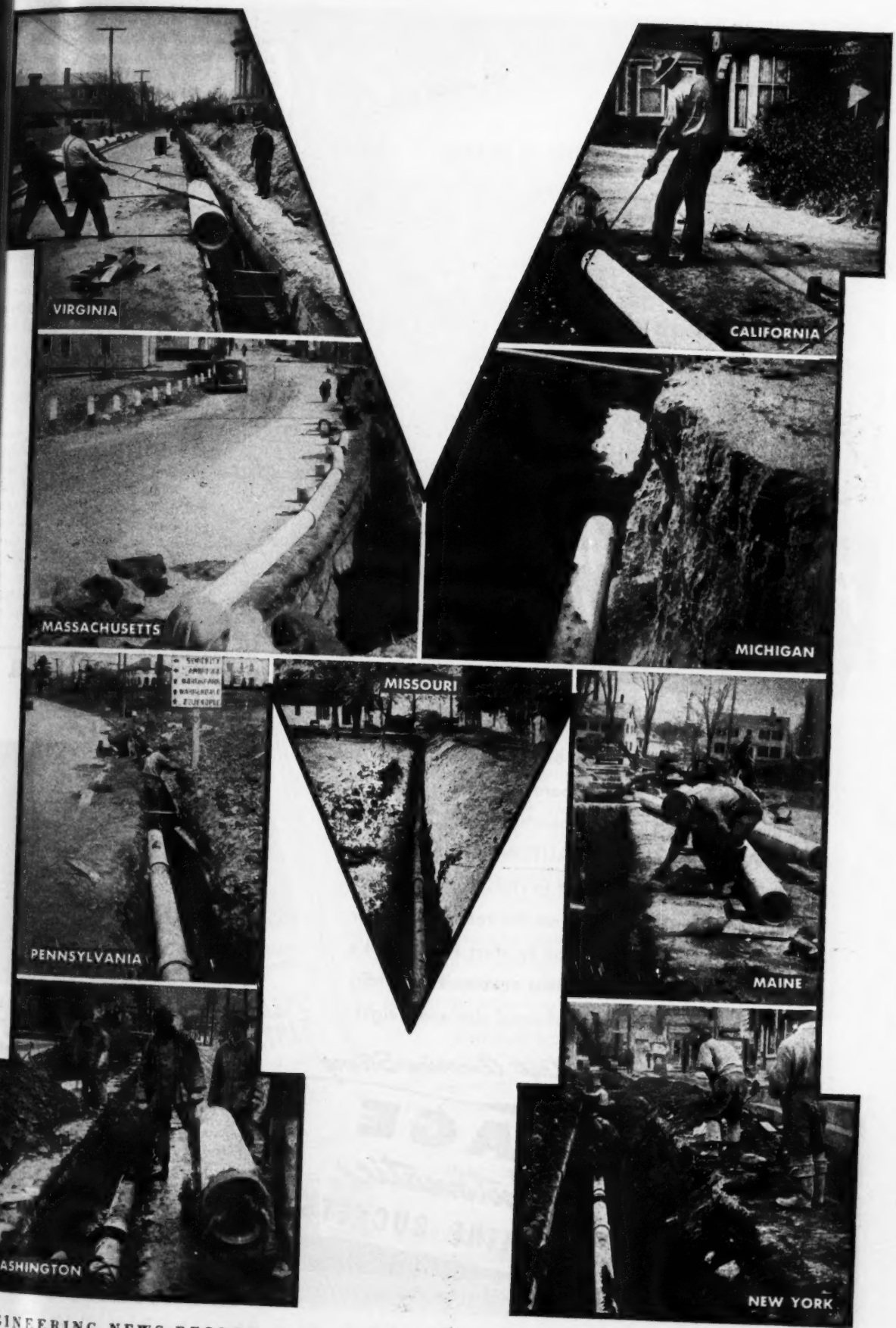
THE RIDGE TOOL CO., Elyria, Ohio, has recently moved from its original factory site at North Ridgeville into a completely remodeled and modernized plant and offices in Elyria. Increased business has made expansion necessary. The new factory provides five times the working space of the old, permitting greater manufacturing efficiency.

APPOINTMENT of the Capitol Tractor & Equipment Co., with offices in Sacramento, and Reno, as exclusive distributors for P&H excavators in a portion of central California and western Nevada, has been announced by the Harnischfeger Corp., Milwaukee, Wis.

HENRY GRAUPNER, Southern sales manager for Marquette Cement Mfg. Co., for the past ten years, has been promoted to general sales manager. He had been in the company's general office in Chicago. John L. Quarles of Jackson, Tenn., has been appointed Southern sales manager. Mr. Graupner recently completed 20 years service with Marquette.

CHARLES J. SHEETS, commissioner of streets for the city of Cleveland, Ohio, for the past six years, has been named general manager of the Allied Corporation, Cleveland paving contractor with offices in the Keith Building. Appointment of Mr. Sheets was effective June 1 and places him in active direction of the company whose president and general manager, M. J. Beistle, died recently. The company is one of the largest in northern Ohio and has held extensive war contracts for asphalt road construction at war plants, airports and ordnance works. Mr. Sheets is a native of Pittsburgh and attended Carnegie Institute of Technology. After several years' experience in bridge, paving and tunnel construction, he served 18 months in France as master engineer on Army hospital construction during the first World War.

GORDON LEFEBVRE has been made president and general manager of the Cooper-Bessemer Corp. of Mount Vernon, Ohio. Mr. Lefebvre succeeds B. B. Williams, former president who will continue as chairman of the board. The company manufactures marine engines for the Navy and Maritime Commission and stationary power units and compressors. (*Continued on p.* 116)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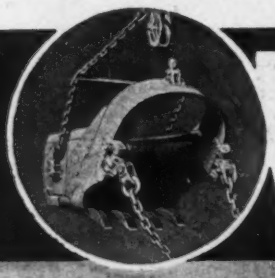
• Page Buckets answer today's call for speed on all earth-moving jobs, because, automatically, they dig right in, doing more work per shift. The result is lowered cost of operation—INCREASED PROFITS for you! It's the AUTOMATIC feature of a Page Bucket that causes it to strike first on its forward arch, and rock back on the teeth, ready for the first pull of the load line to start the bite! It's the AUTOMATIC feature that enables it to outdig any other dragline bucket of equal size and weight.

Boost Production ... Keep America Strong



PAGE *Automatic* DRAGLINE BUCKETS

PAGE ENGINEERING COMPANY • CHICAGO, ILLINOIS

T. M. CUNNINGHAM has been designated general manager of construction and service of Carrier Corporation, Syracuse, N. Y. G. D. Harbin has been named regional construction manager of Carrier's central region to fill the vacancy created by the transfer of Mr. Cunningham. Both Mr. Cunningham and Mr. Harbin are well known in the air conditioning and refrigeration industry.

ON JUNE 15 it was announced at Lawrence, Kan., that H. V. Chase has become the new plant manager for the Hercules Powder Co. at the Sunflower ordnance works near De Soto, Kan. Mr. Chase succeeds George R. Foulke, Jr., who has been transferred to the company's high explosive operating department at Wilmington, Del. Foulke has been in charge of the Kansas plant since April 1942.

LAST MONTH marked the 70th anniversary of S. G. Taylor Chain Company, Hammond, Ind., manufacturers of load and sling chains for all industrial purposes, and tire chains for motor cars, trucks and buses. The company is now producing welded iron and steel chain for the U. S. Navy, U. S. Coast Guard, and U. S. Maritime Commission for anchors, submarine nets, deck lashings, slings, lifeguard buoys, minesweep assemblies, etc.

PROTECTING A STEEL COAL BUNKER IN MINNESOTA

The photograph shows "GUNITE" being applied to the inside of a large coal bunker at the plant of the Minnesota Steel Co., Duluth, Minn., twenty-six years ago and still in first class condition.

• • • • • •

Our Bulletin 2200 shows many examples of the use of "GUNITE" for protecting bunkers, stacks and breechings. Send for your copy today!

The "CEMENT GUN" can be bought by anyone, and used without restrictions.

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Manufacturers of the "CEMENT GUN"
ALLENTOWN, PENNSYLVANIA

WE ARE ALSO "GUNITE" CONTRACTORS
LET US BID ON YOUR WORK

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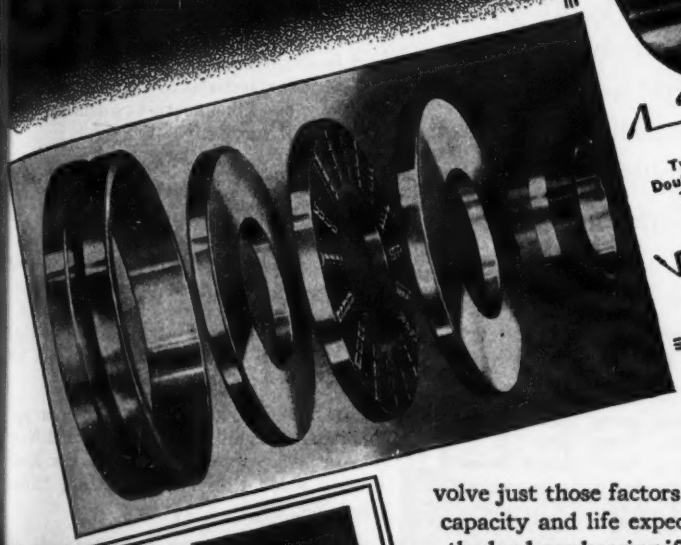
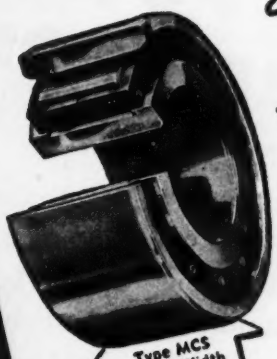
Right-Angle

BEARING LOADING

is the

RIGHT LOADING!





Type MCS
Double Width
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Type SDT
Double Acting
THRUST

Especially

FOR

1. higher bearing capacity in the same dimensional limits
2. oscillating or shock loads
3. heavy thrust loads
4. continuous operation without cool-off
5. longer bearing life under all loads

For longer bearing life, more efficient performance and more economical maintenance . . .

FOLLOW THIS BASIC BEARING PRINCIPLE

- All radial loads carried at *right* angles to the roller axis.
- All thrust loads carried at *right* angles to the roller axis.

● The advantages of Rollway's right-angle bearing loading are so self-evident as to be axiomatic. They involve just those factors that are used in computing the carrying capacity and life expectancy of *every* bearing. In short, reduce the load per bearing if you want to lengthen the life, counteract shock and vibration, or provide freer running.

Rollway Splits Each Load Into Two Parts

Rollway *reduces the load carried per bearing* by the simple expedient of splitting each load into its two simplest components of pure radial and pure thrust. Each of these two components is carried by a separate bearing assembly, and always at right-angles to the roller axis. There are no compound loads, no oblique resultants, to complicate design and pile up stresses. And there is no wedging or pinching of rollers, therefore, markedly less rubbing friction and wear-back of the roller heads.

Standard Sizes for Most Applications

● S.A.E. or American Standard metric dimensions and tolerances in a wide range of sizes and types assure low cost and ready availability for most applications. Let our engineers recommend the types best suited to your needs. Send sketch, drawing, or detailed description for free confidential bearing analysis and recommendation. No obligation.

ROLLWAY BEARING COMPANY, INC., SYRACUSE, NEW YORK

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 **BEARINGS**

Built to give you

MORE POWER . . MORE PROFITS

These dependable Diesels provide true operating economy and years of reliable performance because they are built in every detail for continuous heavy-duty service. They are compact . . . light in weight . . . with wide range of adaptability . . . assuring more power, more profits.

Write for complete information.

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BUY U. S. WAR BONDS

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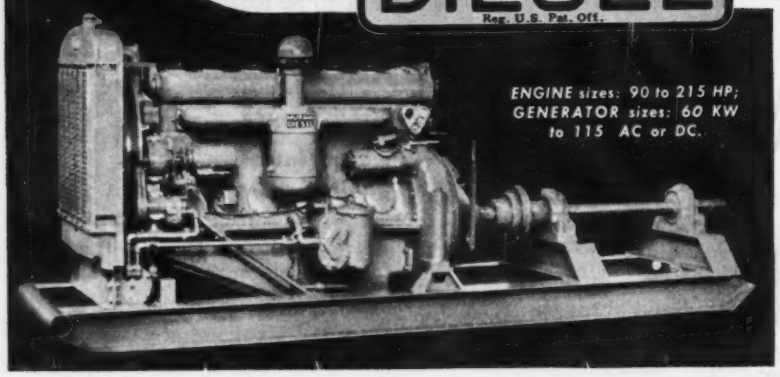

ENGINE sizes: 90 to 215 HP; GENERATOR sizes: 60 KW to 115 AC or DC.

WALTER JOHNSON of Paulding, Ohio, engineer, surveyor, bridge builder, contractor, teacher and editor, celebrated his ninety-fourth birthday last month. This venerable engineer has built over 200 miles of macadam road. Another of his noteworthy accomplishments is the draining of Dark Hollow swamp, a 5,000-acre tract near what is now North Little Rock, Ark.

THE FEDERAL MOTOR TRUCK CO., of Detroit, Mich., which has been engaged exclusively in the manufacture of various types of military trucks for more than two years, has received a directive from the War Production Board to resume the manufacture of certain types of heavy duty trucks for civilian use. This directive now permits truck operators engaged in essential transportation of foods, fuels and other basic civilian and war materials to replace wornout units or meet the emergency demands for additional service.

THE EMPLOYEES of the Joshua Hendy Iron Works, Sunnyvale, Calif., celebrated Memorial Day by delivering to the Maritime Commission the largest number of marine engines ever produced in a single day by any firm in the United States, it is reported by Charles E. Moore, president of the company. The engines will power over 50,000 tons of vessels now being completed.

WILLIAM G. MOORE, JR., has been appointed assistant vice-president and New York sales representative of the Keystone Wood Preserving Co., Inc., Philadelphia, Pa.

ANNOUNCEMENT was recently made of the appointment of A. E. Bedell as chief engineer of Graver Tank & Mfg. Co., Inc., East Chicago, Ind. Mr. Bedell will be in charge of all engineering and development for all divisions of the company.

THE EXECUTIVE OFFICES of Mack Trucks, Inc. have moved from Long Island City to the Empire State Building, N. Y. C.

THE GRIFFIN WELLPOINT CORP. of New York has announced the opening of a

DRILLING ANYWHERE

We look into the earth

PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA.

WILLIAMS *Buckets*

WELDED ROLLED STEEL CONSTRUCTION
All types and capacities for all conditions. Send for Catalog.

THE WELLMAN ENGINEERING COMPANY
7000 Central Avenue
Cleveland, Ohio

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EPPINGER AND RUSSELL CO.
Wood Preservers Since 1878
All kinds of Structural Timbers and Lumber Pressure Treated with Creosote Oil or

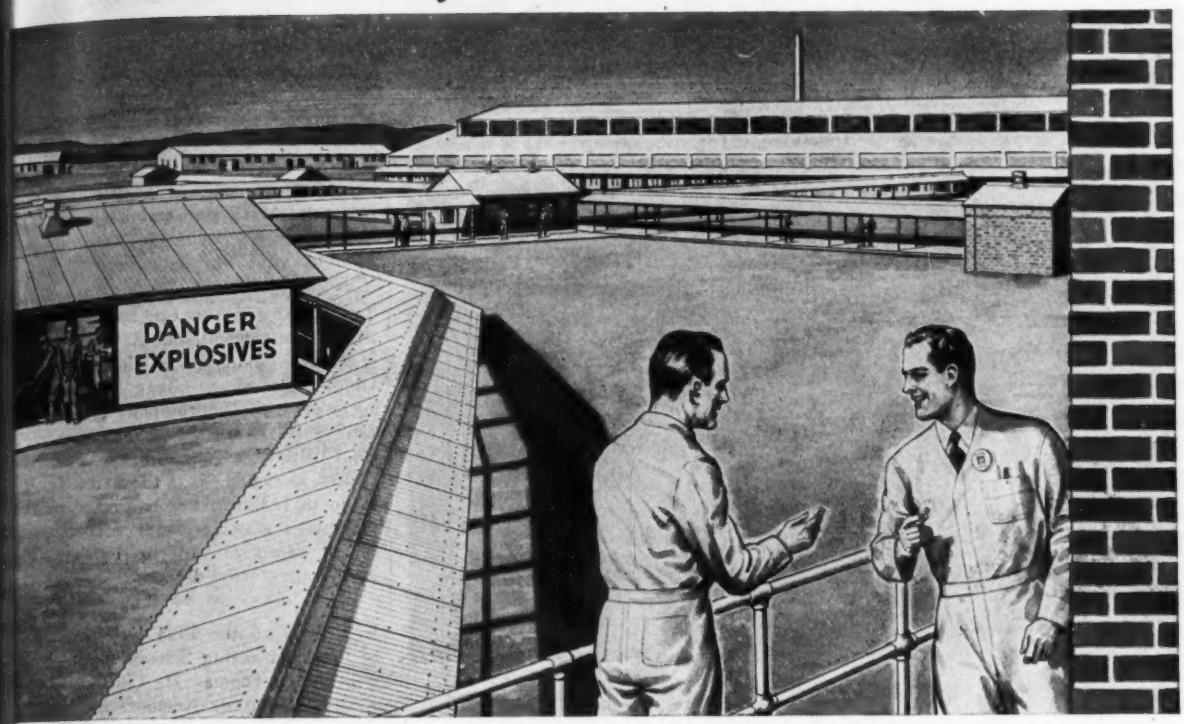
DU PONT CZC Chromated Zinc Chloride

80 EIGHTH AVE., NEW YORK, N. Y.

POLES, CROSS ARMS, PILING, TIES POSTS, BRIDGE AND DOCK TIMBERS

TREATING PLANTS
Jacksonville, Fla. Long Island City, N. Y.

Looking ahead with Asbestos



85 ACRES OF K&M *"Century"* ASBESTOS CORRUGATED for a famous arsenal

It was an immense, urgently needed wartime project. Speed was paramount. The roofing and siding had to go on with no loss in erection time, and it had to provide permanent protection and uninterrupted service for this vital war production plant.

K&M "Century" Asbestos Corrugated met every qualification and approximately 4,000,000 square feet went into place on time . . . enough material to cover an area of 85 acres. This tremendous quantity is only a fraction of the many millions of square feet of "Century" flat and corrugated asbestos sheets that have been used for wartime construction to date.

K&M "Century" Asbestos Corrugated is produced by applying tremendous hydraulic pressure to a combination of asbestos fibre and Portland cement. The result is a truly maintenance-free sheet . . . a material highly resistant to fire and weather.

Previously, all our output of K&M Asbestos Corrugated was reserved for essential war needs. But having met many of these urgent obligations, we can now supply this remarkably adaptable, time-and-money-saving material for general use.

Wartime research at K&M continues to uncover new processes and products, and we are looking forward confidently to the rewards of these achievements in the "V" years to come.

* * *

Nature made asbestos;
Keasbey & Mattison, America's asbestos pioneer, has made it serve mankind . . . since 1873

KEASBEY & MATTISON
COMPANY, AMBLER, PENNSYLVANIA

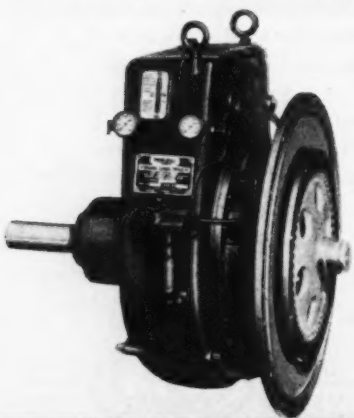
Makers of

asbestos-cement shingles and wallboards; asbestos and magnesia insulations for pipes, boilers, furnaces; asbestos textiles; asbestos electrical materials; asbestos paper and millboard; asbestos marine insulations; asbestos acoustical material; asbestos packings; asbestos corrugated sheathing and flat lumbers; asbestos-cement pipe for water mains

COULD YOU SET THIS LOAD ON AN EGG?

Some crane operators claim that with a Twin Disc Hydraulic Torque Converter they could set a heavy load like this on an egg without breaking it. We've never seen it tried but we have seen I-beams weighing several tons held in the air and then inched into position with just as delicate a touch.

We know that the Twin Disc Torque Converter will multiply your engine's torque at low speeds, allow it to lift and maneuver a load of three to five times its normal torque capacity without shock or jerk—with no chance of stalling the engine.



Why not write for the whole story on Hydraulic Drives? Ask for Bulletin No. 132, Hydraulic Division, Twin Disc Clutch Company, Rockford, Ill.

Illustrated left is a Twin Disc Hydraulic Torque Converter.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES
REG. U. S. PAT. OFF.

TWIN DISC CLUTCH COMPANY • RACINE, WISCONSIN

southern branch office and warehouse at 633 North Myrtle Ave., Jacksonville, Fla. William J. Carr is the manager.

GORDON LEFEBVRE has been made president and general manager of the Cooper-Bessemer Corp. of Mount Vernon, Ohio. Mr. Lefebvre succeeds B. B. WILLIAMS, former president who will continue as chairman of the board. The company manufactures marine engines for the Navy and Maritime Commission and stationary power units and compressors used by vital war industries.

THE INLAND STEEL CO. has announced the appointment of John S. Gregg as district sales manager of the Cincinnati, Ohio, sales office. Gregg has been associated with the company since 1935, after having worked with the Moise Steel Co., Milwaukee, Wis. Inland's new Cincinnati sales office is in the Carew Tower. Kenneth J. Burns, former Cincinnati district sales manager, is now at Chicago in an executive capacity in the plate and shapes sales division.

IN ACCEPTING the 1943 Egleston medal of the Engineering Schools of Columbia University, Thomas H. Chilton, of the E. I. du Pont de Nemours & Co., said that saving to the government of more than $600,000,000 in construction costs alone have resulted from improved processes developed in recent years by the engineers and chemists of his company. Mr. Chilton said that development work carried out by duPont engineers since the beginning of the year in connection with the manufacture of strong nitric acid has resulted in a saving of more than $250,000,000. Nitric acid is absolutely essential to military explosives and, of course, is in increasing demand at the present time.

PLANS for a new research laboratory of the Ilg Electric Ventilating Co., 2850 No. Crawford Ave., Chicago, have been approved by the board of directors, according to a statement released by John M. Frank, president.

W. H. ROBERTSON recently has been elected vice president of the Massey Concrete Products Co., Chicago, Ill. Mr. Robertson is a graduate of Massachusetts Institute of Technology and Harvard University, and an associate member of the American Society of Civil Engineers. He has been associated with the Massey organization and its predecessors since 1922. Prior to 1927 he was assistant chief engineer and since that time has been located in New York City, first as resident manager and later as eastern sales manager. His new location will be 122 So. Michigan Ave., Chicago.

YOU wouldn't build a sidewalk out of spikes!

—we know you're not so silly. It just isn't done—unless, perhaps, you're an Indian magician and want to punish yourself.

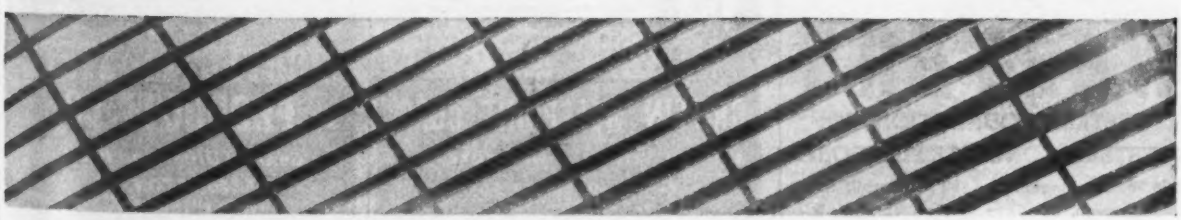
And—we sincerely hope that you won't do anything as ridiculous when you buy steel floors—that you specify and buy only GENUINE Open Steel *GRATING* Floors. Walking over surfaces that do not have scientific walking built into them—that do not have carefully tested tolerances of slippage that prevent tripping—is exceedingly dangerous, a sabotage to manpower.

According to engineers, certain slippage is necessary for ease in walking. Pushing loads over floors with excessive deflection is not only dangerous, but hard work.

GENUINE Open Steel *GRATING* Floors are scientifically designed with *no sharp edges* that deny the proper slippage. They thereby add to the safety and efficiency of the men and women who use them.

Write today for a guide to correct specifications and standard practices to the Open Steel Flooring Institute, First National Bank Bldg., Pittsburgh, Penn.

OPEN STEEL FLOORING INSTITUTE, INC.



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STEEL PILES
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COMPOSITE PILES
WOODEN, STEEL OR CONCRETE SHEET PILES
COMPRESSED CONCRETE PILES

DRILLED-IN CAISSONS

Engineers available for consultation on any foundation problems. Catalogues on request.

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WESTERN FOUNDATION CO.
WESTERN CONCRETE PILE CORP.

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Spring Design and Engineering—With the rapid multi plication of mechanical and industrial spring-activated equipment and products, the need for an up-to-date manual on spring is apparent. This manufacturer has met this need with a convenient manual complete in formulas of spring design and engineering for compression, extension, torsion, flat spiral, motor or flat springs, wire forms, etc., with illustrations, diagrams and tables. The manual provides the executive, engineer, production man or purchasing agent with all required information, compact and readily accessible. *—Mid-West Spring Mfg. Co., 4262 S. Western Ave., Chicago, Ill.*

Distribution Panels—A revised bulletin describes panel boards designed to meet the rigid requirements of wartime

GRIFFIN

GRIFFIN

WELLPOINT SYSTEMS

JETTING PUMPS

FOR SALE RENT

Prompt Shipments

Send for our New 60 page illustrated catalog
"GRIFFIN POINTED WELLPOINT FACTS" chock full of latest information on Wellpoint Systems for dewatering, emergency and permanent water supply systems, also information on pressure pumps and data for jetting.

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Protected Steel
ROOFING AND SIDING
available now!

Positive Protection

In A P S, a thick (20 lbs. per square) protective coating is BONDED DIRECTLY TO THE STEEL at high temperature. Into this coating is impregnated a special mica finish, which adds further protection and improves appearance.

This protected metal withstands all extremes of weather, as well as acid fumes, corrosive dusts and salt air.

Economy

Its low first cost is practically the only cost, because A P S requires no painting when erected or thereafter, and gives years of maintenance-free, satisfactory service!

A P S can be obtained in stock sizes from leading distributors throughout the country.

Write for new descriptive folder or Engineers' Handbook No. 4

Ad No. 6

PROTECTED STEEL PRODUCTS CO.

General Office and Plant,
WASHINGTON, PA.

New Wire Rope Simplification Plan Welcomed by Users

In this, the 16th of a series of informative articles on wire rope, the Macwhyte Wire Rope Company presents a condensed report of "Simplified Practice Recommendation R198-43." This sound and widely discussed plan was developed through the combined efforts of the National Bureau of Standards and engineers of the Wire Rope Industry. This timely information will be most useful to wire rope users.

* * *

For many years, both wire rope users and the wire rope industry have hoped for a reduction and simplification of the number of wire rope items. The wide variety of items was not only confusing to users, but also increased the problems of manufacturing and stocking so many different ropes.

Shortly after Pearl Harbor, it became obvious that both a steel and a manpower shortage would develop. Since reduction and simplification of wire ropes would help save steel, conserve time and manpower, and expedite deliveries, the Bureau of Standards worked out a plan described in "Wire Rope Simplified Practice Recommendation R198-43." Copies may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. Price 10 cents. This plan is one which consumers, distributors and manufacturers have long wanted; not only as a wartime conservation measure, but as a basis for improved service afterwards.

What, briefly, is this simplification plan? How does it affect you?

The wire rope simplification program is concerned primarily with a reduction in the number of different sizes, varieties, and grades of wire rope produced for stock purposes.

Wire rope engineers working with the Bureau of Standards found that 20 wire rope constructions cover the vast majority of wire rope tonnage.

By adhering to these constructions, the number of ropes are reduced from 973 to 643, or 33.9%.

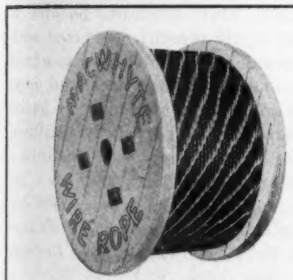
How Users Benefit

By reducing the number of "special" ropes, more attention can be paid to faster production of those ropes most widely used. Better service and delivery can be made to users as larger stocks will be available due to greater production of fewer items.

Your Cooperation

Hundreds of manufacturers, distributors, users, and all wire rope manufacturers have indicated in writing, their acceptance of this simplified wire rope practice which will result in increased efficiency for manufacturers, distributors and users . . . not only now but also in the post-war period.

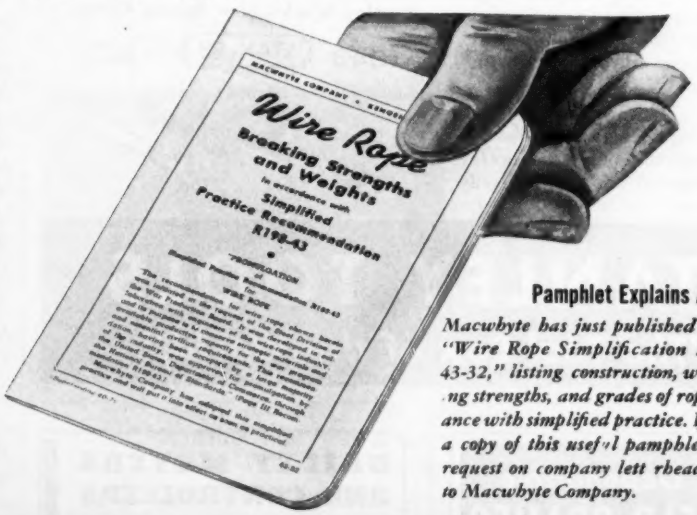
Wire rope users can aid materially in the success of this program by voluntarily confining their specifications and orders, so far as possible, to the items recommended by the simplified practice program.



MACWHYTE WIRE ROPES

—the correct rope for your equipment.
PREformed and Internally Lubricated.

NO. 681



Pamphlet Explains All

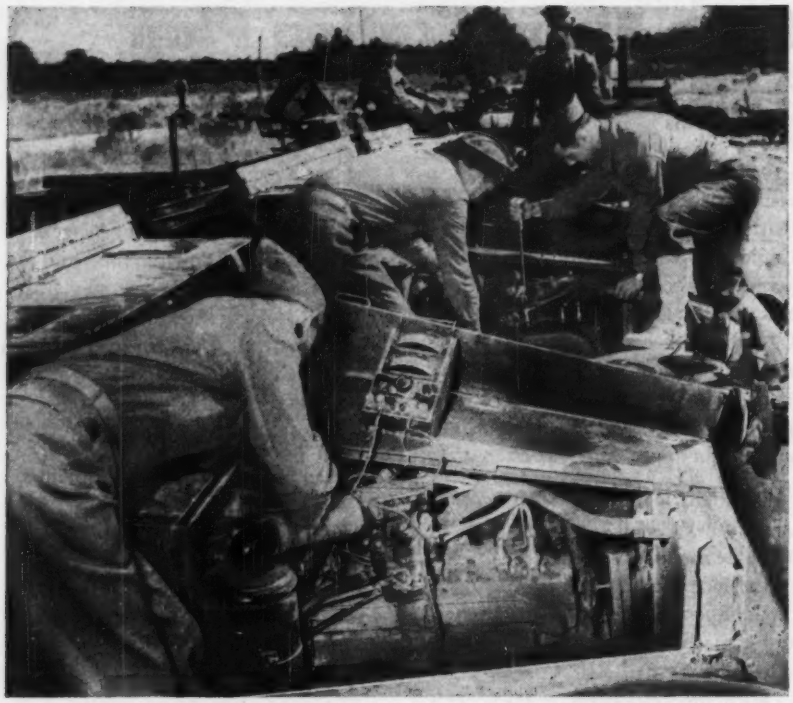
Macwhyte has just published a pamphlet, "Wire Rope Simplification Practice No. 43-32," listing construction, weights, breaking strengths, and grades of ropes in accordance with simplified practice. If you care for a copy of this useful pamphlet, write your request on company letterhead and send it to Macwhyte Company.

MACWHYTE COMPANY

WIRE ROPE

2930 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A.
Manufacturers of MACWHYTE PREformed and Internally Lubricated Wire Rope MONARCH WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Rope MACWHYTE ATLAS Braided Wire Rope Slings MACWHYTE Aircraft Cables and Tie-Rods



Official Photo U. S. Signal Corps

TOOLS *to "Keep 'em Rolling"*

Our modern army rolls up to battle in motorized equipment—jeeps, trucks, tanks, combat cars of every description. To build them, and to keep them in service in the field takes *Tools*, millions of them.

Stanley, "The Tool Box of the World," is supplying a large share of this unprecedented demand. Stanley Tools for normal use are necessarily restricted. Buy them only for *essential* use. Stanley Tools, Division of The Stanley Works, New Britain, Conn.

1843 STANLEY 1943

STANLEY TOOLS

"The Tool Box of the World"

Fast, Dependable

SHOVELS, CRANES

DRAGLINES, BACK HOES

Crawler or Truck—Gas or Diesel

10 Models of 3/4-5/8-1/2-3/8 cu. yd.

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DISTRIBUTORS THROUGHOUT THE WORLD

BAILEY METERS AND CONTROLLERS

FOR SEWAGE TREATMENT AND WATER SUPPLY . . .

● Venturi Tubes, Weirs, Flumes, Nozzles and other primary elements; Mechanically and Electrically operated Registers and Complete Automatic Control Systems.

BAILEY METER COMPANY

1029 IVANHOE ROAD ● CLEVELAND, O.

Bailey Meter Co. Ltd., Montreal, Canada

construction for such equipment employing interchangeable switch units. Special panels are built to government requirements.—*Square D Co., 6060 Rivard St., Detroit, Mich.*

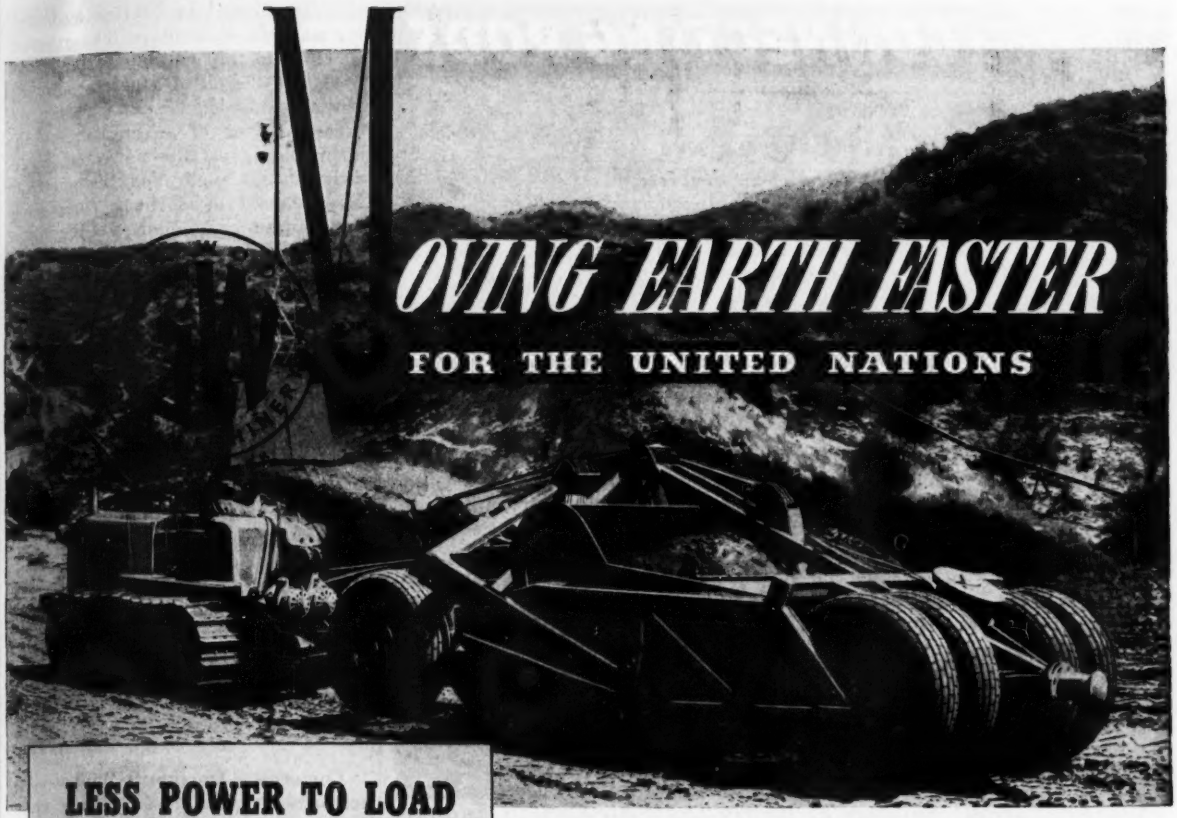
Whiteprints for Shop Work—This is a new folder illustrating how a print with maroon lines on a white background stands up in comparison with a blueprint under actual shop conditions. It points out that the maroon lines show even when covered with grease or dirt stains, making it possible to follow the smallest detail. The folder also contains samples of the complete line of new sensitized materials which are 50 percent rag content and develop blue, black, maroon and sepia lines. In addition, the dry developing process is completely described and the whiteprint machines are pictured.—*Ozalid Products Division, General Aniline & Film Corp., Johnson City, N. Y.*

Zinc Plated Steel Sheets—A folder describes a product introduced several months ago—zinc plated steel sheets. This is important as zinc is considered one of the best known rust resistant coatings.—*American Nickeloid Co., Peru, Ill.*

Mineral Wool—A publication of the U. S. Department of Commerce, the first commercial standard ever promulgated on mineral wool industry products, has been issued. This standards booklet is of interest to all persons connected with the low temperature field. The standard covers both cold storage area and pipe line mineral wool insulation. It is based on extensive research by fully qualified engineers comprising the Institute's Specifications Committee, and also includes recommendations by engineers for the refrigeration field generally.—*Industrial Mineral Wool Institute, 441 Lexington Ave., New York, N. Y.*

Air Lines—A folder entitled "Aiding War Production with Clean, Dry Air" points out the unnecessarily high maintenance and replacement costs and loss in man-hours resulting from moisture and dirt in compressed air lines. How the apparatus made by this company cleans and dries compressed air by centrifugal force is graphically shown. How the compact, cast units are placed in the line is shown and complete specifications are given for sizes from 3/8 to 10 in.—*Logan Engineering Co., 4900 Lawrence Ave., Chicago, Ill.*

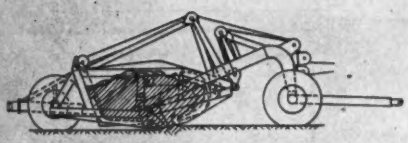
Magnetic Drain Plug—This catalog



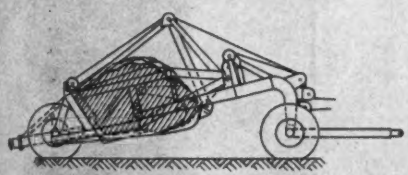
MOVING EARTH FASTER

FOR THE UNITED NATIONS

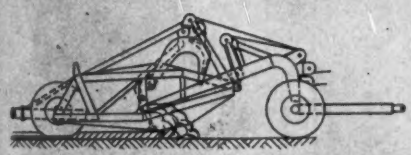
LESS POWER TO LOAD



(1) LOADING POSITION



(2) CARRYING POSITION



(3) DUMPING POSITION

GW Cable-Controlled Scrapers provide three ways to speed-up earth moving, do the job in shorter time—and "clear the way" to Victory!

Illustrations, left, show the loading, carrying and dumping positions. When loading (1) the line of draft is located to prevent the cutting edge from being pulled out of the ground. Weight is evenly distributed. Boiling action of dirt, loads the bowl and gate with a minimum interference of the material already loaded. In the carrying position (2) the high center clearance of the cutting edge is ideal over soft or uneven ground.

Front portion of load dumps (3) by raising the apron. Remainder of the load is forced out efficiently by *positive rolling ejection*, as the bottom of the bowl reaches a steep angle, resulting in less cable wear. Wide space between cutting edge and apron permits dumping large sticky loads without interference. The cutting edge remains fixed while dumping, thus providing accurate control of depth of spread.

The GW Road Machinery line is complete—consisting of both Hydraulic and Cable-Operated Units.

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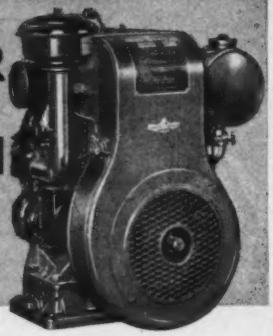

The length of rods in Wisconsin Engines is 2½ times the length of the stroke. This extra length is an important factor in reducing vibration to a negligible minimum because *long rods reduce angularity* and this, in turn, reduces piston pressures against the cylinder walls. The shorter the rod, the greater the vibration and wear — so we don't use short rods in Wisconsin heavy-duty air-cooled engines. Another detail that contributes to Wisconsin dependability.

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contains engineering information regarding magnetic drain plugs, the purpose of which is to trap cuttings of metal that work into the oil of a gear case or engine. By stopping this abrasive material excessive wear of bearings, gears and other moving parts is prevented. In addition to this application, the plugs can also be used in oil lines, compressors and hydraulic assemblies.—*Lisle Corp., Clarinda, Iowa.*

Permanent Plastic Coating—A permanently plastic material, which is applied like paint to protect boiler drums, metal, wood or concrete storage tanks and water-submerged surfaces against corrosion and fungus growths, is described in a bulletin just published. Since it never dries hard, this product stretches and contracts with temperature changes, eliminating the danger of hair-line cracks in the coating which would permit undetected corrosion under the protective surface. The manufacturers state that it will not melt, freeze, crack or peel at temperatures from below freezing up to 500-550 deg. F.—*Saverite Engineering Co., Hoboken, N. J.*

Compressor Operator's Manual—This instruction manual in addition to covering details on portable, industrial com-

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pressors, gives full information on other equipment of this manufacturer including a supplement on the operation and maintenance of pneumatic tools. This data was included because the work actually performed at the end of the hose is said to be as important as that of the compressor itself.—*Davey Compressor Co., Kent, Ohio.*

Electrode Index—A new electrode comparison chart helps to simplify buying of competitive welding electrodes. The chart details the principal AWS and ASTM electrode classifications and indicates which electrodes produced by 20 leading manufacturers meet the different requirements. The buyer can use this chart to determine what brands of electrodes fall within a specified category, as well as to learn what alternate brands might be used successfully should a specified electrode not be available.—*G. Van Alstyne, Air Reduction, 60 East 42nd St., New York, N. Y.*

Chlor-O-Feeders—In order to take care of the requests of research laboratories and state board of health district engineers, a new bulletin has been issued giving complete information on the installation, operation and maintenance of the heavy duty midget Chlor-O-Feeder.—*Proportioneers, Inc., 9 Codding St., Providence, R. I.*

Metallizing—A folder describes a new time and money-saving unit for preparing hardened metal surfaces for metallizing. A patented air-cooled electrode holder, states the manufacturer, permits high speed bonding without fear of overheating, pre-hardening or distortion. Guesswork in preparation is said to be eliminated and there is no necessity for a lathe. It was developed originally to prepare heat treated surfaces for metallizing but works equally well on all metals.—*Metallizing Co. of America, 1330 W. Congress St., Chicago, Ill.*

Water Technology—A 10-page booklet reviewing the progress made during 1942 in industrial water conditioning has been issued. The survey of water technology is divided into ten subjects: Water in the war production program, water the raw material, process water for industry, water treatment, water analysis, corrosion, boiled feedwater and cooling water, bacteriology and biochemistry of water, equipment and recent books on water and related subjects. Under each of these ten headings appears a brief description and listing of the important articles written on the subject during the

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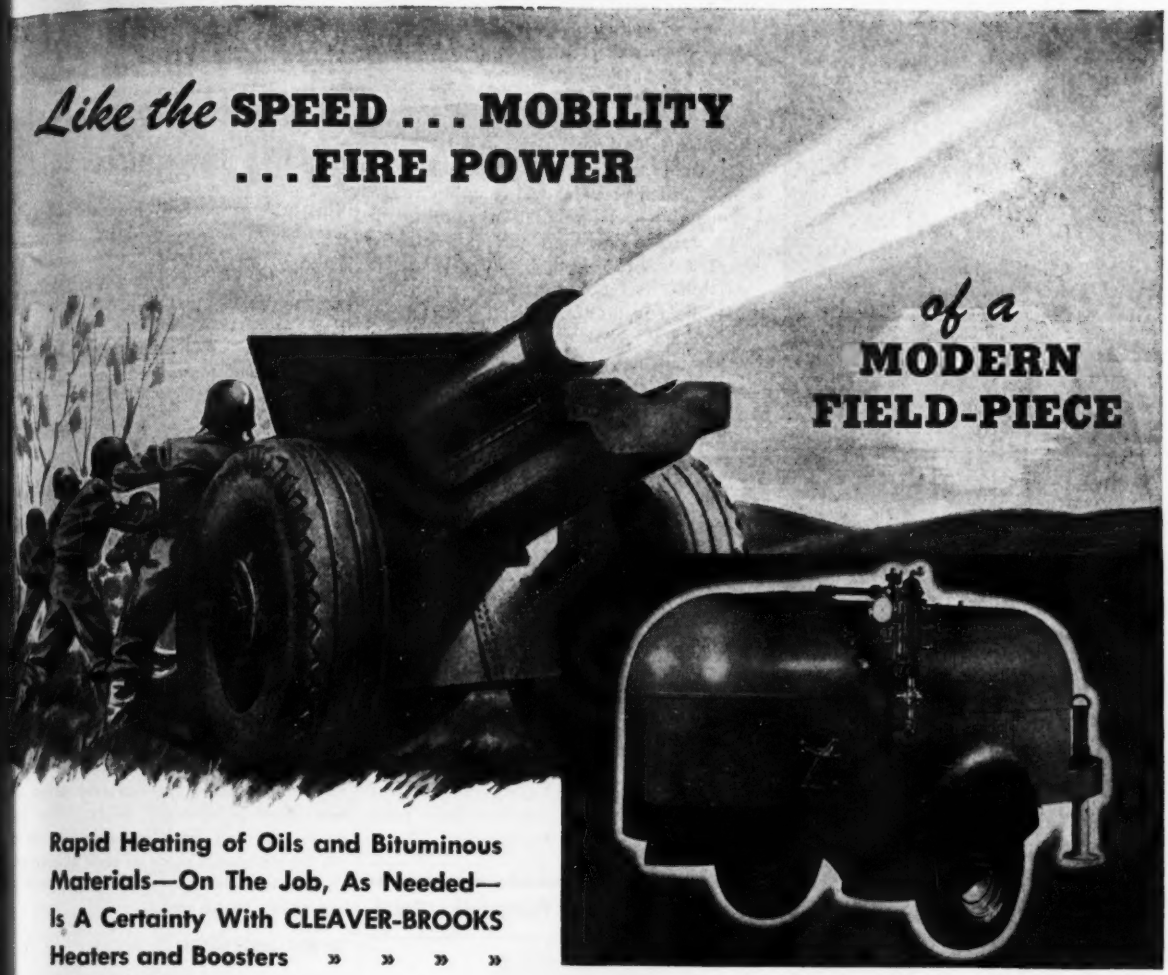

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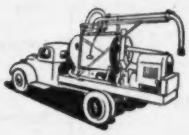
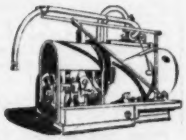
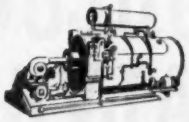

past year.—*W. H. & L. D. Betz, consulting chemical engineers, Philadelphia, 24, Pa.*

Adjustable-Speed Drive—This booklet describes an electronic adjustable-speed drive which provides wide stepless range, automatic speed regulation and smooth, fast acceleration with automatic current limitation. The 4-page, illustrated booklet tells how the apparatus works and lists its advantages. Chart shows motor speed characteristics for a 20 to 1 speed range, 10 to 1 speed range, and constant speed. In the new drive, incoming a-c power is converted to direct current by thyratron tubes, which supply the direct current to armature and field circuits of the d-c driving motor. A potentiometer in the control station varies the voltage of the current by shifting the phase of the grid control voltage of the thyratrons. Both armature and field circuits are controlled by one dial on the control station. —*Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.*

Lubricants to Speed Production—In a booklet entitled "90 ears of Industrial Pioneering", not only is the progress in development of lubricating oils interestingly presented but also how these products are helping to win the war.—*Swan-*

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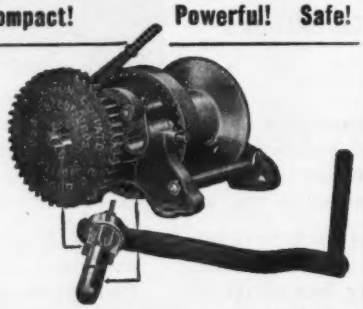

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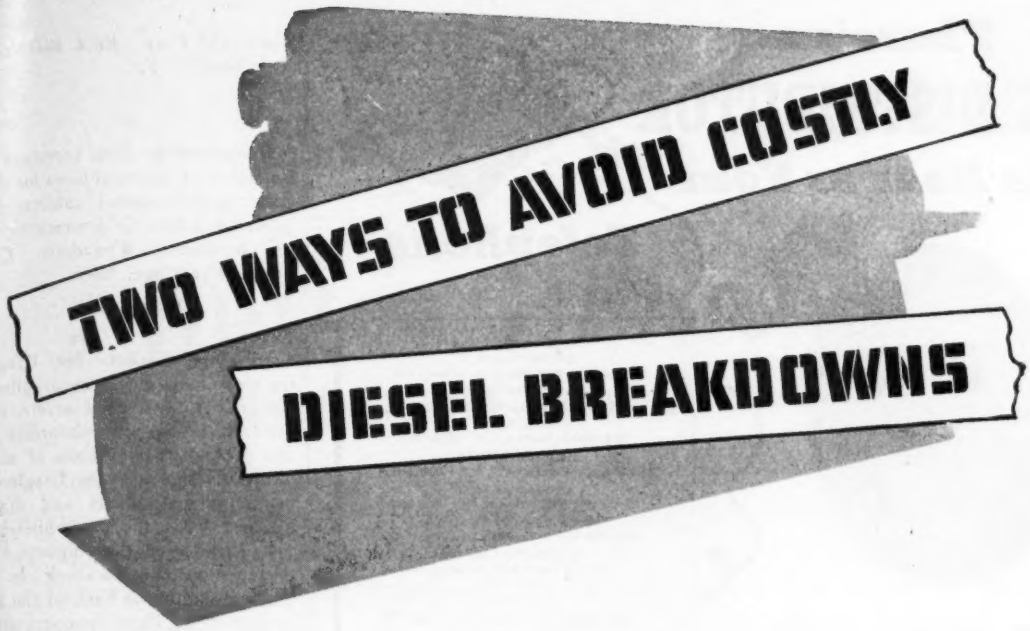

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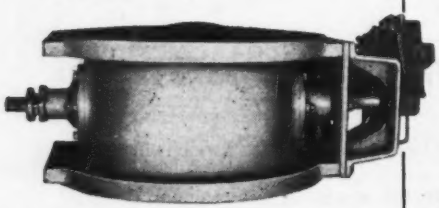

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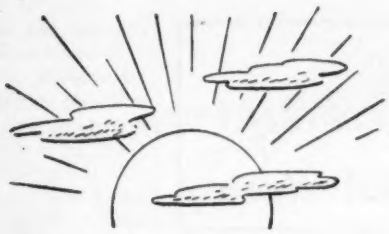
Dustproofing—This literature contains a number of practical hints for the application of the material "calcium chloride," as well as tables for determining the rates of treatment.—*Wyandotte Chemicals Corp., Wyandotte, Mich.*

Dragline Bucket—The Dragliner is the trade name for a new dragline bucket designed to withstand severe operating conditions. Ribbed reinforcing sections are present at all points of stress and wear. A feature of the Dragliner is the combination bumpers and drag chain hitches. When the empty bucket is dropped, it lands on the bumpers which are designed to take the shock. In this way the arch, which is back of the bumpers, is protected. These bumpers also shield the drag hitches so that the bucket does not fall on them, resulting in a longer service life for the hitches. The weight is well distributed, permitting a low hitch. As a result, this bucket takes hold in tight material without a tendency to stand on its nose, so its manufacturers claim.—*Universal Engineering Corp., Cedar Rapids, Ia.*

Profits in Concrete—Is the title of a booklet explaining how it is possible to get lower cost, better quality, and more uniform day-to-day, batch-to-batch consistency without investing in new equipment, has been announced by the—*Scientific Concrete Service Corp., McLachlen Bldg., Washington, D. C.*

Cleveland's Pumping Station—At the annual meeting of the American Water Works Association in Cleveland last month, this company distributed a leaflet entitled "Cleveland Pioneered," which recounts briefly the planning and development of Cleveland's three great pumping stations, all equipped with geared turbine-driven centrifugal pumps. The leaflet contains a chart which shows the duties to be expected from geared turbine-driven pumping units of various capacities and adapted to use steam at modern pressures and temperatures.—*DeLaval Steam Turbine Co., Trenton, N. J.*

Concrete Mortar Computation—This booklet provides reliable data from which engineers, architects, contractors and others may determine the quality of material required for variously designed



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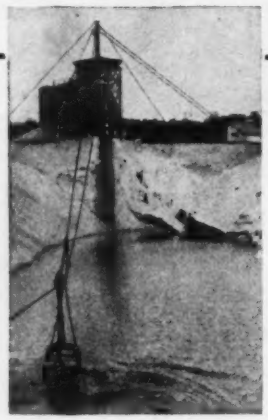

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Kerlow Open Steel Flooring is SAFE, because its open mesh, non-skid design provides slip-proof footing under all conditions . . . allows light to reach dark corners . . . assists ventilation . . . prevents accumulations of oil or small objects . . . provides ample strength . . . resists deterioration.
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concrete and mortar mixtures.

In order to meet the requirements of all concrete proportioning data is made available on volumetric basis as well as a basis of weight of different materials. However, it is recognized in this publication that proportioning by weight after accurate determinations have been made of specific gravities and free moisture content of the aggregate is the best method for controlling concrete mixtures. —*North American Cement Corp., 41 East 42nd St., New York, N. Y.*

Clipper Shovels—An illustrated 24-page bulletin shows the advantages of power control in the operation of excavating equipment. Convertible shovels, cranes, trench hoes, draglines and pile drivers are pictured.—*Buckeye Traction Ditcher Co., Findlay, Ohio.*

Worm gear—Units for three-inch and 3½-inch center distances are described in a leaflet issued by the DeLaval Steam Turbine Co., Trenton, N. J. These gears are supplied for either top or bottom drive and in ratios from 3⅝ to 1 up to 60 to 1, and are intended particularly for the operation of low-power machinery, such as small mixers, dryers, automatic furnaces and ovens, conveyors and elevators, mechanical stokers, etc. The lower ratios can be used as speed-increasing gears where the maximum worm speed does not exceed 1,750 rpm.—*De-Laval Steam Turbine Co., Trenton, N. J.*

Stran-Steel—A 12-page booklet featuring the latest Stran-Steel designs—two features which have hitherto not been published. Both of these features pertain to the versatility of strip steel as a building material, such as Stran-Steel now rolled to a curve in the same operation which forms the nailing groove, which offers a distinct advantage in view of the fact that buildings framed from the arched member thus formed require less material—framing, roofing, insulation, and so forth. The other new feature described is the Stran-Steel, C-section, a structural member made entirely from strip steel cold-formed to shape. Buildings framed completely in C-sections have been designed for clear spans up to 130 ft. The catalog will be sent upon request to—*Great Lakes Steel Corp., Stran-Steel Division, 1130 Penobscot Bldg., Detroit, Mich.*

Caterpillar Diesels—A new 8-page booklet, which describes in detail how "Caterpillar" diesels are serving and saving. Interesting sketches and photographs are used to illustrate a series of questions and answers. Those who are interested in knowing more about diesel

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engines will find these data both interesting and valuable—*Caterpillar Tractor Co., Peoria, Ill.*

Detachable Bits—An 8-page booklet entitled "The Seven Points of Efficiency," lists seven points of exceptional significance claimed by this manufacturer for detachable bits: (1) Heavy and strong; (2) easily removed from shank; (3) can be resharpened by forging; (4) no metal lost in sharpening; (5) fewer bits lost in hole; (6) minimum shank breakage; and (7) lowest final cost—*American Mining & Research Co., Eagle and Lawrence River Road, Upper Darby, Pa.*

Print-Making—This manufacturer has just issued a handbook of print-making and processing covering the use of blueprints, direct process prints, sepia prints, and reproduced tracings, listing the advantage of each. The handbook is designed to save time and effort on the part of those charged with blueprint production.—*Paragon-Revolute Corp., 77 South Ave., Rochester, N. Y.*

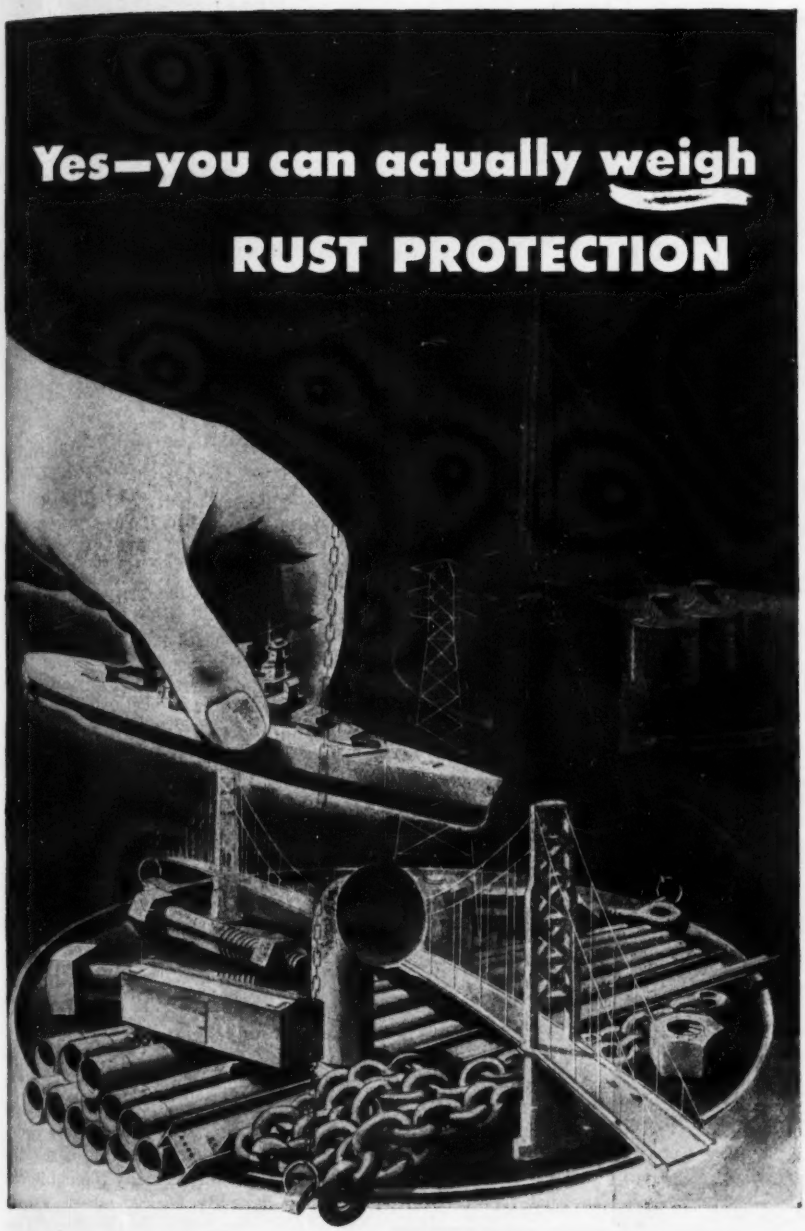
Photocopy Equipment—This folder is self-explanatory, listing the type of work done and showing the many time and labor-saving features offered by this device which speedily reproduces photocopies of letters, forms, blueprints, drawings, photographs, etc., without the necessity of a big investment in equipment that may require special skill—*The American Photocopy Equipment Co., 2849 N. Clark St., Chicago, Ill.*

Vibrating Equipment—This 176-page book covers electric vibrating equipment used for material handling and processing operations such as feeding, conveying, cooling, drying, packing, screening and many special applications.—*Century Electric Co., 1806 Pine St., St. Louis, Mo.*

Induction Polyphase Motors—In this catalog are described and illustrated motors which it is claimed combine all of the proved results of more than 40 years of progressive design engineering and manufacturing experience. The motors are offered in five different types representing different values of starting torque and starting current.—*Century Electric Co., 1806 Pine St., St. Louis, Mo.*

Butterfly Valves—A four-page illustrated bulletin contains complete dimension tables for butterfly valves, 15 to 125 psi. It features valves for regulation and

Yes—you can actually weigh RUST PROTECTION



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JOHN FINN METAL WORKS, SAN FRANCISCO
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MAINE
THE THOMAS LAUGHLIN CO., PORTLAND

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SOUTHERN GALVANIZING COMPANY, BALTIMORE

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OLIVER IRON & STEEL CORPORATION, PITTSBURGH

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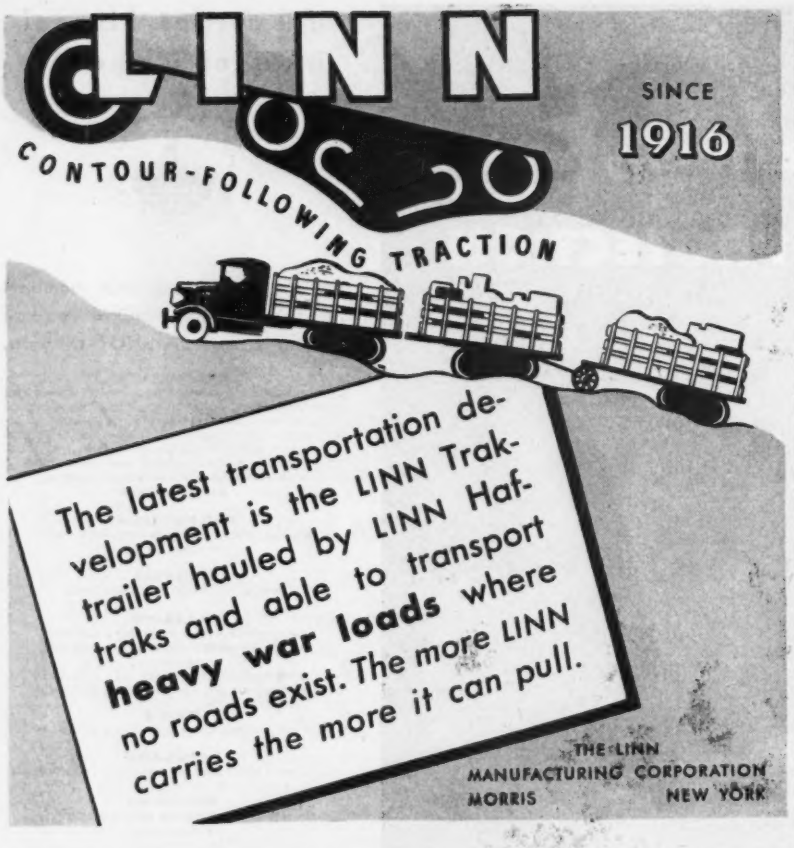
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. . . they give you what you want. Designed for a wide range of applications, the standard 2¾" diameter head is quickly interchangeable with a grinding head for use where wet rubbing or dry grinding is required. Use of a chuck in place of grinding wheel converts grinder into a drill.

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shut-off duty for air, gas, steam, liquids and semi-solids—manual and automatic control.—*R-S Products Corp., Wayne Junction, Philadelphia, Pa.*

Caterpillar Products—A new 16-page booklet entitled "Caterpillar Producing for Victory" has just been published. It is fully illustrated and relates the story of how Caterpillar products have answered the call on the home front and stresses the part they play in the construction industry.—*Caterpillar Tractor Co., Peoria, Ill.*

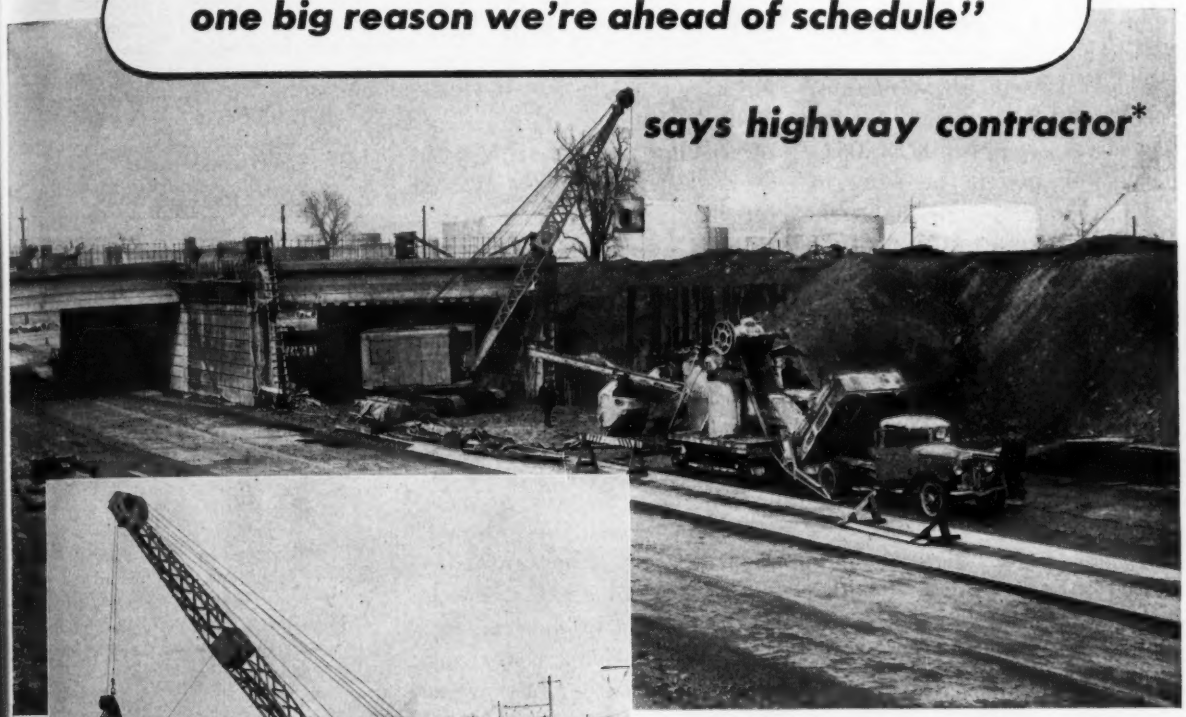
Vapor Cleaner—This folder illustrates and describes a vapor cleaner which was designed to clean and thaw differential, transmission and transfer cases of motor vehicles. The equipment permits servicing as many as five housings at one time, and it is said that the complete job can be done within seven to ten minutes. —*Circo Products Co., 2835 Chester Ave., Cleveland, Ohio.*

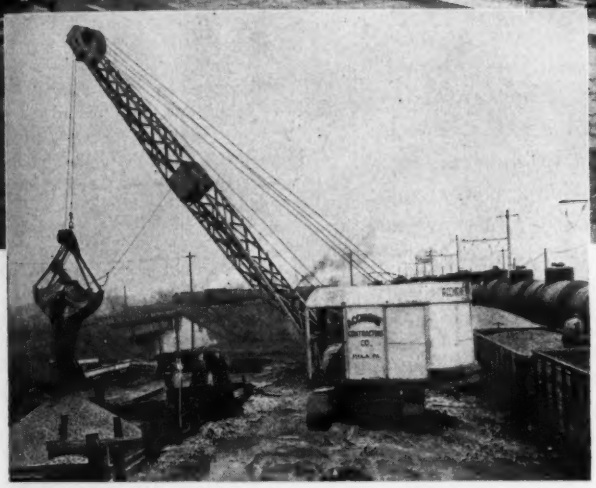
Deck Machinery—A very complete 48-page catalog describes the electric and steam cargo winches, warping winches, and anchor windlasses manufactured by this company, all of which it is claimed meet the approval of the U. S. Maritime Commission, naval architects, the Bureau of Marine Insurance and Navigation, and others.—*American Hoist & Derrick Co., St. Paul, Minn.*

Temperature Control—A 12-page bulletin covers self-operated temperature regulators and mixing valves to control cooling currents on internal combustion engines, compressors, condensors, degreasers, stills, etc. It is completely illustrated and includes many typical hookups, also capacity tables, prices, etc.—*Sarco Co., Inc., 475 Fifth Ave., New York, 17, N. Y.*

Control Systems—In some industrial processes it is not only essential that temperature, pressure, flow or liquid level be controlled at a constant point but experience has proved that it is desirable to increase temperature or pressure gradually at times to a certain high point and hold it at that point for a definite length of time and then decrease at a predetermined rate. For such processes the control system described in this bulletin provides information concerning the proper time scheduling to insure continuous maximum production for uniform quality.—*The Brown Instrument Co., Division of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.*

"With Gulf Lubricants
we steer clear of mechanical delays—
one big reason we're ahead of schedule"
says highway contractor*





*Acchione Contracting Co., Philadelphia, Pa. is engaged in constructing an important road in the Philadelphia industrial area. This job involves grading, paving, and building a new railroad bridge without stoppage of railroad traffic. With Gulf lubricants and fuels, this contractor is ahead of a tough schedule.

Call in a Gulf Service Engineer before you start your next job—he can help you get extra hours of trouble-free service from your equipment.

"With new equipment and spare parts hard to get, more than ever we rely on proper lubrication with Gulf oils and greases," says highway contractor.* "Gulf lubricants provide the kind of protection that heads off mechanical troubles and keeps our equipment on the job—one big reason we're ahead of a tough schedule."

The progress and profit on any construction job depend to a large extent on the efficiency of the equipment that does the work. That is why many leading contractors have adopted Gulf Lubrication as a standard part of their operating practice—they know from experience that they get full capacity performance and extra hours of trouble-free service from every unit.

Call in a Gulf Service Engineer before you start your next job—let him demonstrate the *higher protection value* of Gulf Quality Lubricants. He will show you how you can get more efficient lubrication of your equipment at no additional cost! Write or 'phone your nearest Gulf office today.

GULF

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Minutes Instead of Hours for Replacing Dipper Lip

The term "renewable" is one of variable meaning, notably at the time when a dipper lip or front has to be changed.

The Amsco all-manganese steel *rivetless* renewable lip dipper (U. S. Patent No. 1,945,064) meets the present necessity of saving operating time and manpower.

All that need be done in removing a worn Amsco rivetless lip is to loosen the "U"-bolts between lip and back, remove four forged split keys between lip and front, and the lip is *off*. Putting on the new lip is just as quick and simple. No rivets or special tools are used, and yet the lip is fastened as securely to the body as if riveted. And the shovel down-time is a matter of minutes, instead of hours — or days.

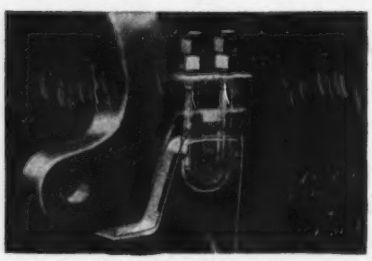
The Amsco renewable lip feature largely reduces the delay and expense involved in removing worn riveted fronts and riveting on new ones because the lower front casting normally outlasts several lips and lip changes can be made in the field—no need for hauling the dipper to the shop for repairs.

The Amsco dipper takes a bigger bite and a greater heap load because of the "rolling-in" action of the extended lip contour with its sharp full-sweep sides, the finger-like teeth, and the smooth, unobstructed body interior. These features result in maximum speed of shovel operation. The slight outward taper toward the door eliminates arching or binding of material and the positive latching, clear-swinging door insures fast, clean dumping.

The Amsco renewable lip dipper is a "must" for these times of limited manpower.

Ask for Bulletin 641-D on Amsco dippers.

Renewable lip dipper; showing smooth interior and lip and teeth shaped for smooth, fast cutting.



Above: Showing detail of "U" bolts that hold lip to back casting. Left: Lip removed to show ease of replacement.

Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois

AMERICAN Brake Shoe COMPANY

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OFFICES IN PRINCIPAL CITIES

New Valve Catalog—"Valves—Fire Hydrants and Accessories" is the title of a new and comprehensive catalog published by the Darling Valve and Manufacturing Company.

Consisting of 302 fact-filled pages, the catalog is bound in a permanent board cover and printed on a good grade of coated stock. There is an excellent system of indices, which permit easy references to products. Hundreds of cutaway line drawings and photographs are backed up with explanatory text and tables of dimensions. In addition, there is adequate information on installation and maintenance. Copies may be obtained by writing to—*Darling Valve and Manufacturing Co., Williamsport, Pa.*

MEN AND JOBS

C. L. White of New Bern, N. C., recently resigned as assistant director of malaria control for the North Carolina State Board of Health to accept a commission as a first lieutenant in the Army Sanitary Corps.

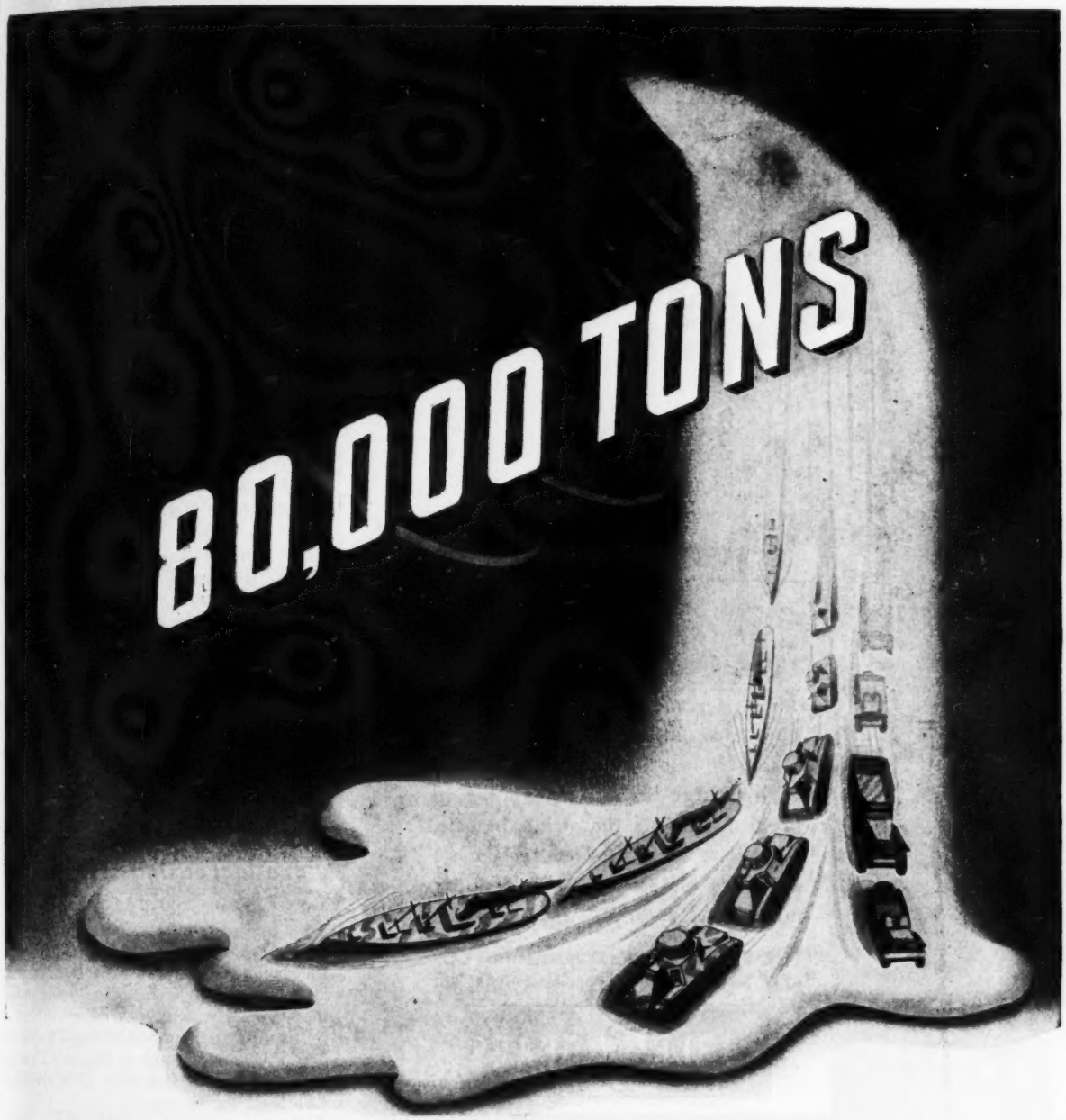
T. R. Day, formerly Polk County, Minn., highway engineer, is the new county engineer of Hubbard County. He succeeds Wendell P. Huber, who has taken a position as Redwood County highway engineer.

Fred Nance, a civil engineering senior at Iowa State College, and Loren A. Duffey, a civil engineering senior at the University of Iowa, were given junior memberships in the American Society of Civil Engineers, as winners of two student awards made at a meeting of the Iowa Section in Des Moines.

L. I. Kleinknecht has been appointed deputy to County Engineer Kenneth H. Hinkley, of Coshocton County, Ohio.

Capt. Emil H. Rausch, Jr. is now a major, and **Lieut. Noble A. Bosley** is now a captain. These men are connected with the Corps of Engineers at Seattle. Major Rausch is assistant to the chief of the Alaska operations division of the Seattle office, and Captain Bosley is assistant to the chief of the operations division of the Seattle district.

Maj. Curtis A. Nelson, former area engineer at the Pine Bluff Arsenal, and **Captain Jefferson Farmer,** assistant to the area engineer at the Ozark ordnance works, El Dorado, Ark., have been transferred to the Little Rock, Ark., district office of the United States Engineers. Major Nelson will have charge of the



80,000 tons of ferrous metal. Enough tonnage for 3,000 medium tanks. Or 8,000 trucks. Or 60,000 jeeps. Or 20,000,000 rifles. Or 8 Victory ships.

This is the all-out war conservation made possible by hundreds of miles of Reinforced Concrete Pressure Pipe during the past two years. In war and in peace, concrete pipe is ideally suited for water supply mains, sewers and culverts.

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EARLE GEARS

ordnance facilities of the military construction division, Little Rock district. Captain Farmer will direct recruiting for engineering specialists.

H. M. Smith, Algona, Ia., has been granted a leave of absence from his job as Kossuth County, Ia., engineer to work on the Alcan Highway this season. **C. E. Chubb** will be in charge of the engineer's office during his absence.

Claude Hamlin, acting county engineer in Mills County, Ia., has resigned to take a similar position in Montgomery County, Ia.

M. V. Stephenson, formerly an area engineer with the WPA, has become sanitary engineer for the Iowa department of health at Manchester, Ia. He was graduated from Iowa State College in civil engineering in 1934.

R. H. Stange, who is stationed overseas, has been promoted to major. Major Stange is a former engineer for Republic Steel Corp. and is with the engineers in the army.

NEWS OF THE WEEK

(*Continued from p.* 57)

Wage determination cases are increasing steadily

Though the total dollars-and-cents value of government construction jobs has decreased in recent months, the Wage Determination section of the Department of Labor is actually handling more cases than formerly, with a similar increase reflected in the number of cases handled by the Wage Adjustment Board. That is because the actual number of individual jobs is on the increase.

This is accounted for by the fact that with the big and important construction projects largely out of the way, there is now time for building of secondary importance: a year ago the important thing was to get an airfield constructed; today there is time to add an administration building. At present, however, most of the projects are housing and extensions of various kinds.

The Wage Adjustment Board has not had a single decision reversed by the War Labor Board during the first ten months of its activity which got under way the first of July last year. During that period the adjustment board, which acts on wages for government projects only, handled 1129 cases, and issued decisions in 903, of which approximately 70 per cent were denials. The remaining

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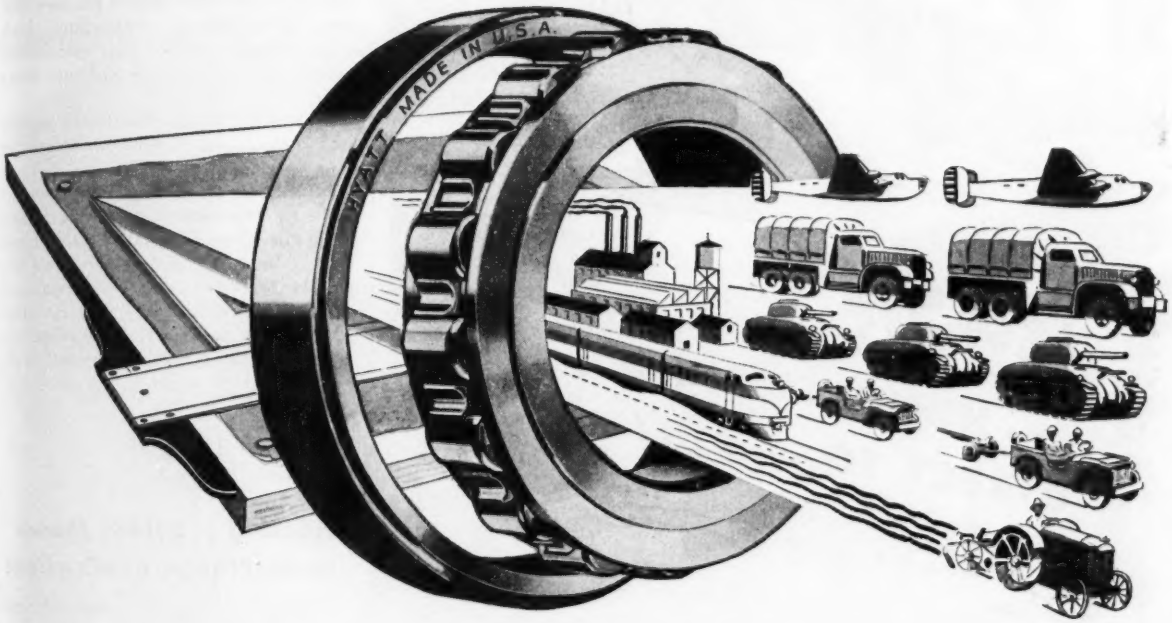
Blueprints of Victory now flow from Boards which conceived America's Industrial Leadership



To design engineers, accustomed to overcoming mechanical obstacles in their stride, the Axis was just another problem for them to lick.

So they reached into their bag of tricks...the old American "know-how"...and came up with a thousand nightmares for the Axis dream.

And in designing these mighty weapons they naturally called on one of their chief stocks in trade—dependable Hyatt Roller Bearings, to help them in the job.

For that reason, you'll find Hyatt Roller Bearings built into the tools of fighting as well as farming, into tanks as well as trucks, into ships as well as machine shops, into warplanes as well as war workers' cars... carrying on their uninterrupted fight against friction and wear, making possible better design and, of course, the better performance which goes with it.

Hyatt Bearings Division, General Motors Corporation, Harrison, N. J.

HYATT ROLLER BEARINGS

Scores of quantity orders for the "Victory Hut" to house our armed forces have been received by us—and filled, shipped and completed with speed incredible in these times.

Other Engineers and Personnel Officers *right now* can fill *their* housing needs. We're busy turning out scores of Victory Huts daily, but we can still produce more. Furthermore, Victory Hut quality is attested by thousands of men who have lived in them; and the speed with which they can be made available will surprise you!

Air-Space insulated, fully pre-fabricated, demountable and portable, Victory Huts afford the means by which you can house men comfortably, healthfully. And of particular interest to you—Victory Huts mean an actual eventual saving to government of $30 to $50 per man housed!

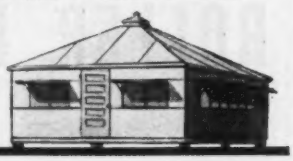
From every standpoint, Victory Huts offer the solution to the military housing problem. Let us prove these statements! Write or wire for prices and time of delivery today!

TEXAS PRE-FABRICATED HOUSE & TENT CO.

Dallas, Texas

1245 Shoreham Bldg., Washington, D. C.

MAKERS OF "VICTORY" HUTS AND "VICTORY" HOMES



226 still are to be acted on. Only six or seven cases have been appealed to the War Labor Board.

In making adjustments between the determined rate of the contractor and the prevailing wage rate of the local area, there is no set rule for arriving at decisions, but each case must be decided on its own merits.

Cases arise in some areas where there has never been a prevailing wage rate, because there is no skilled labor in the community nearest the job. And in some instances government projects have been scheduled in uninhabited back country where three or four surrounding cities all have a different prevailing wage.

Though the Adjustment Board handles both union and non-union cases, the great preponderance have to do with union labor. Requests for adjustments made by contractors in recent months outnumber those from labor three to two. That is because the prevailing rate frequently is higher than the determined rate of the contractor—who is immediately eager to offer the prevailing rate in order that he may be assured of an adequate labor supply.

. . .

Housing progress shown by mortgage applications

Applications for mortgage insurance on 14,518 proposed privately financed family dwelling units to be built for occupancy by war workers were filed with field offices of the Federal Housing Administration during May, FHA Commissioner Abner H. Ferguson has announced. This compares with applications involving 16,918 units which were filed during April.

In the first five months of 1943, the FHA issued commitments to insure war housing loans totaling $248,431,094 which will finance approximately 60,000 dwelling units. The applications for insurance on new war housing submitted by private lending institutions in May involved mortgages of $62,687,700 compared with $70,704,605 in April.

Upwards of 85 percent of all privately financed war housing is now covered by mortgage insurance written by the FHA under Title VI of the National Housing Act, which protects lending institutions against loss on their war housing loans. Interest rates on Title VI mortgages are limited to a maximum of 4½ percent on one to four-family structures and of 4 percent on large rental projects, plus the FHA insurance premium of ½ of 1 percent.

Construction of 47,698 family dwelling units being financed by FHA-insured

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five months of the year, Mr. Ferguson said. In the same period, 46,161 FHA-insured dwellings were completed.

In May, 12,460 dwelling units were started and 11,227 were completed. This compared with 13,917 units started and 9,769 completed in April.

Typical of large scale war housing projects is that at Johnsville, Pa., one-half mile south of the plant of the Brewster Aeronautical Corp. The Federal Public Housing Authority is negotiating for 196 acres on which to erect 700 housing units. It is hoped to begin construction this month and have the development ready for occupancy Oct. 1, according to John T. Egan, regional FHA director. There will be four- and six-family dwellings, a community building, a child care building, stores, beauty parlors and barber shops, Egan said.

• • •

North Dakota engineers must now be registered

An act providing for the registration of professional engineers, passed by the North Dakota legislature and approved by the governor, went into effect July 1, making North Dakota the 46th state to require such registration.

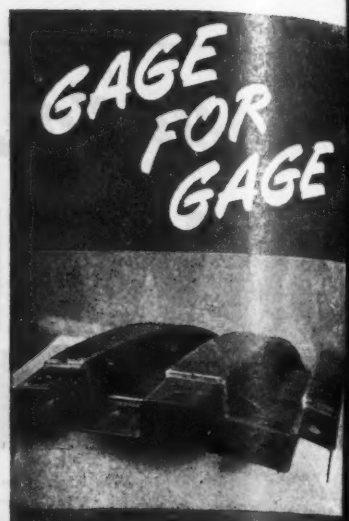
The North Dakota act conforms closely to the model law which has been approved by nearly all of the national and regional engineering societies. Governor John Moses has appointed Jay Wesley Bliss, city manager, Minot; Alexander Carothers Burr, consulting engineer, Jamestown; and Clifford Johnson, bridge engineer, state highway department, Bismarck, to the three-member state board of registration for professional engineers.

• • •

Gray urges arbitration in construction field

Richard J. Gray, acting president of the Building and Construction Trades Department of the American Federation of Labor, has a plan to forestall government intervention in industry. He suggests that labor and employer organizations in the construction industry agree to arbitrate their differences. Gray spoke at a luncheon meeting in New York recently held by the Building Trades Employers Association of New York, to celebrate 40 years of successful arbitration of all labor differences.

Outstanding labor leaders of the city were guests. Christian G. Norman, chairman of the board of governors of the organization for 24 of its 40 years, told how adherence to the principles of fair play and arbitration had kept



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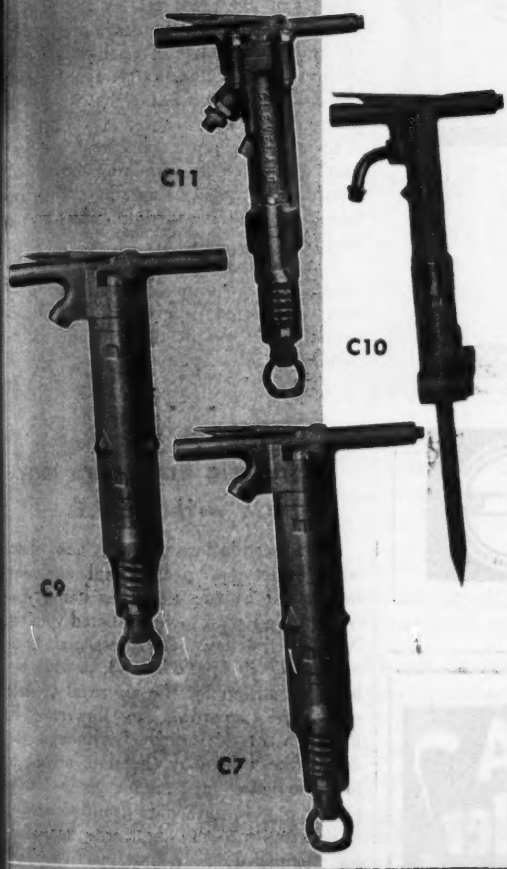

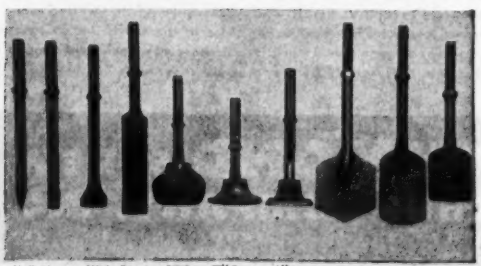

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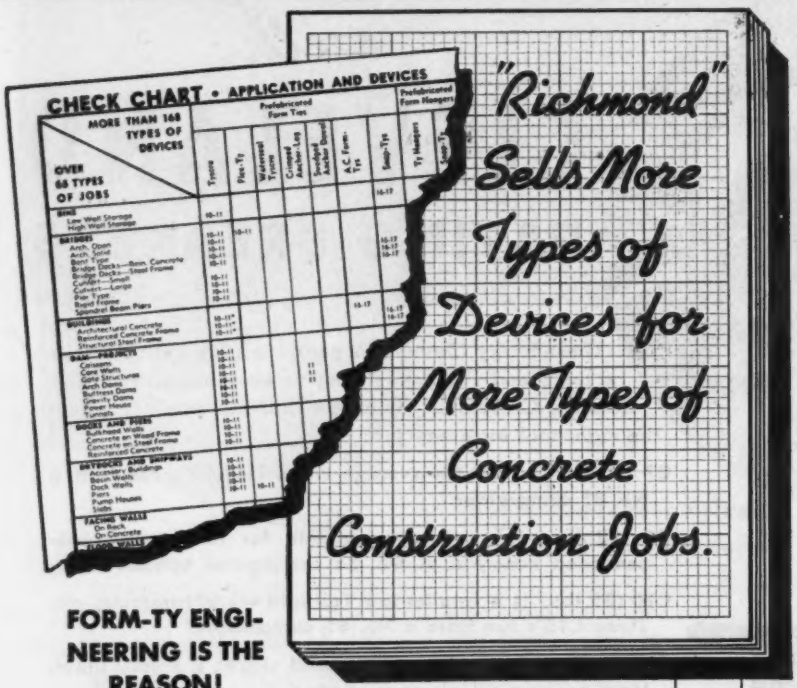
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the building trades free of nearly all labor troubles.

Gray spoke after hearing Norman explain how this arbitration had been in use for many years but warned that in spite of such proof of the working of present arbitration agreements, new theories may be imposed by persons who are not familiar with the problem. Mr. Gray pointed out that as soon as the war is over, construction will be expected to resume immediately and undoubtedly it will be the guinea pig on which some pet theories of some who have had little practical experience in labor-employer relationships will be tried out.

• • •

Florida Canal project still alive, Pepper says

Senator Claude Pepper said at Ocla, Fla., on June 16, that the United States Army Engineers will prepare detailed plans and specifications for the Florida Barge Canal in order to have them ready if funds are made available later for construction of the waterway. He said the engineers have $2,000,000 which can be used for this purpose.

In making the announcement, the Senator stressed the development of all Florida waterways as an "objective which should have the support of all the people of the state."

Senator Pepper said that when detailed plans for the barge canal have been completed, funds for its construction will be sought through one of the deficiency bills.

• • •

Wisconsin engineers may affiliate with N.S.P.E.

Recommendations that a new state-wide society of professional engineers be formed by the 1,300 registered Wisconsin engineers, to be affiliated with the National Society of Professional Engineers, (ENR Apr. 29, 1943, p. 645) has been submitted for the approval of state engineers, according to Lawrence E. Peterson of Milwaukee. Although the committee named by the state engineers to investigate this matter finds formation of a new state-wide group desirable, it will be up to the engineers themselves to decide upon definite action, said Mr. Peterson. Besides Peterson, who is chairman, members of the state-wide committee are Hans P. Dahlstrand, William J. Urban and William E. Crawford, all of Milwaukee; Henry J. Hunt and Prof. Ben. G. Elliott of Madison; Archie E. Becher, Wausau, and George W. Martin, Green Bay.

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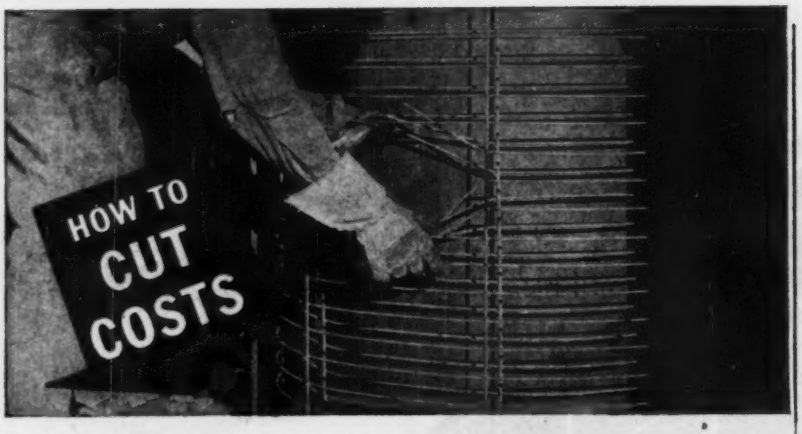

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BRIEF NEWS

The Public Service Commission of New York State has announced the elimination of 71 railroad grade crossings throughout New York in 1942 at an estimated cost of $13,666,400. and the proposed removal of 13 crossing involving an estimated $5,000,000 expense. Reviewing progress of crossing elimination, the commission said that 912 special danger points had been removed since 1926 and that 578 additional crossings had been removed.

The South Dakota State Highway Commission has granted raises to all of its employees. The raises range from $5 a month for clerical help to $15 for the departmental heads. The raises are retroactive to April 1, 1943.

There is considerable discussion in Detroit, Mich., and Windsor, Ont., regarding the possibility of the building of an international airport on the Canadian side of the Detroit River after the war. It is pointed out that Detroit-bound passengers landing at the proposed field near the Canadian end of the Ambassador Bridge could get downtown in Detroit in 15 minutes.

The city of Cincinnati, Ohio, received $107,000 from the sale of scrap material and equipment in 1942, which is more than double the amount received from scrap in 1941. Sales included abandoned street car rails and accessories, cast iron pipe, steel, copper, old boiler tubes, paper, rags, grease drippings, etc.

The value of all kinds of building permits issued in Columbus, Ohio, during the first four months of this year slumped $2,417,305 behind those of a corresponding 1942 period, the superintendent of the city building department reports.

Wartime Housing, Ltd., a government corporation charged with the erection of thousands of houses for munition workers, has constructed 15,392 dwellings in various parts of Canada at an average cost of $2,229. A large percentage of these houses have four bedrooms but there were 6,773 two-bedroom houses erected at an average cost of $1,959.

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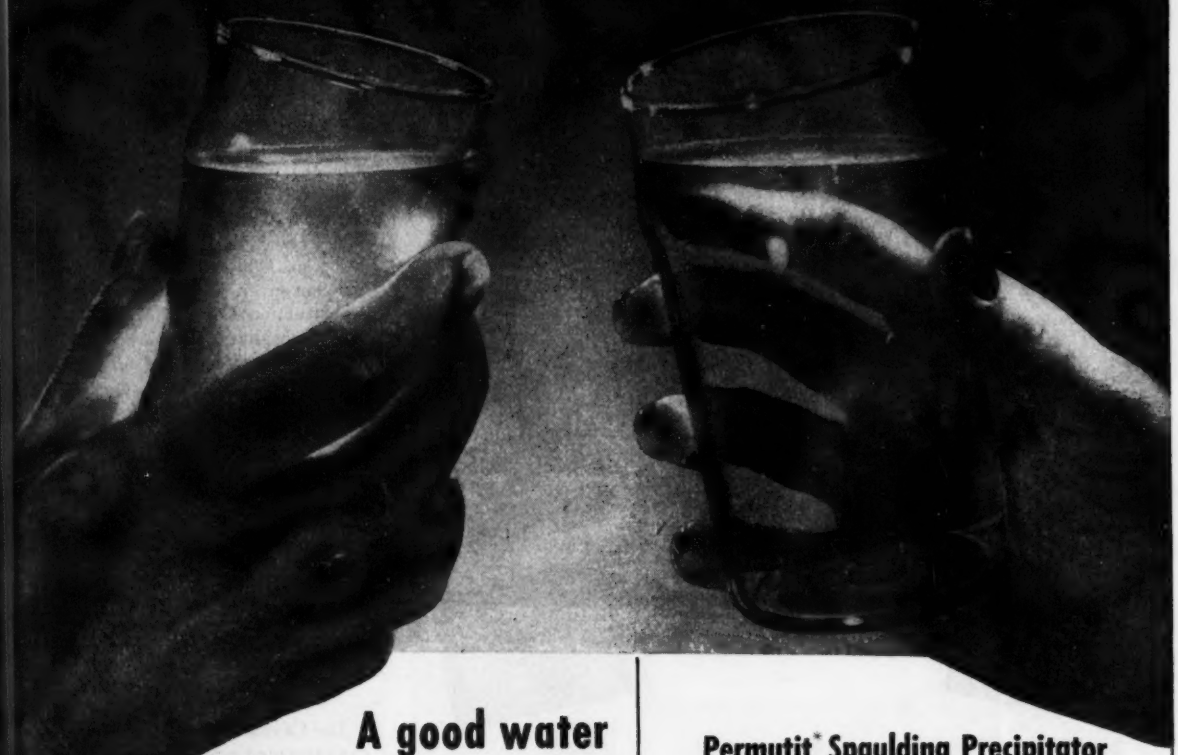

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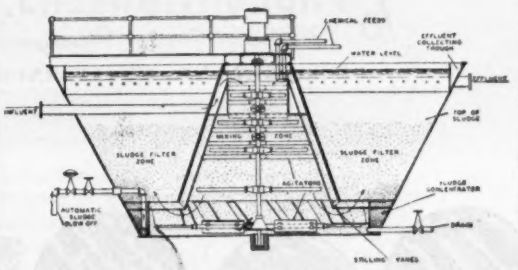

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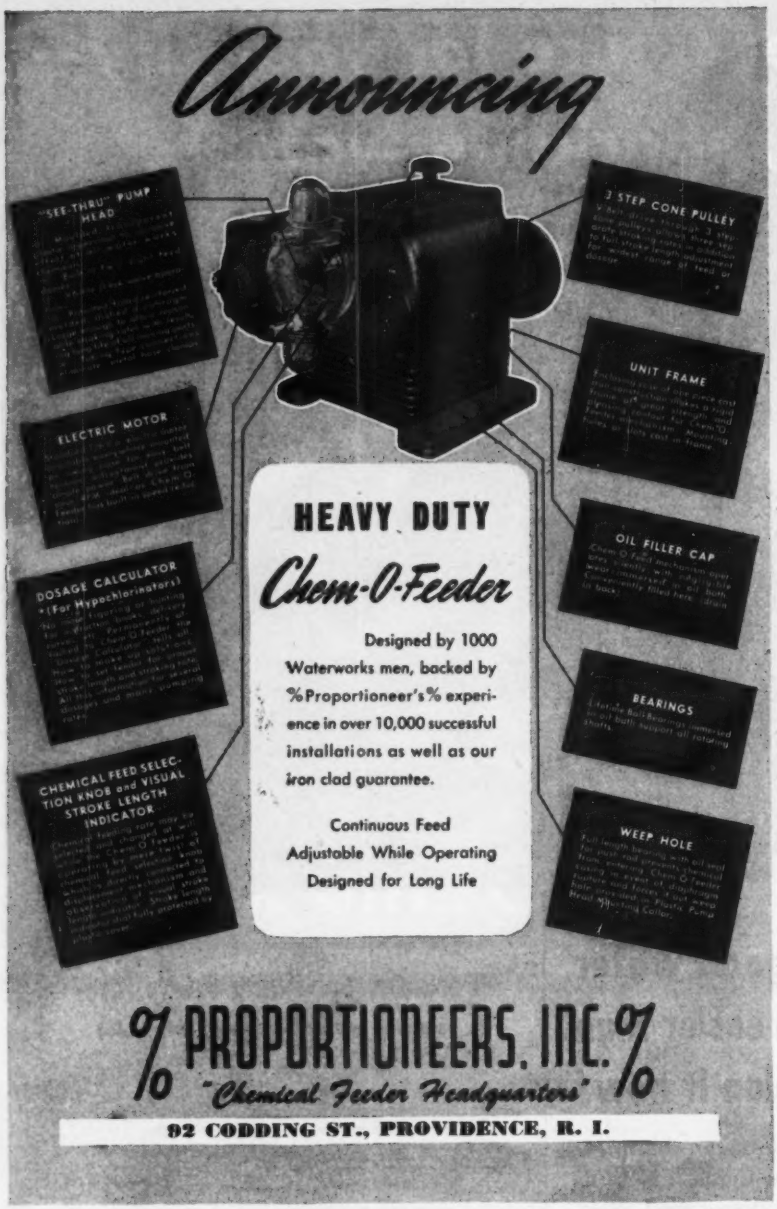

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REPRESENTATIVES IN PRINCIPAL CITIES

National War Labor Board ruled that employers can grant increases which do not bring wage or salary rates above 40 cents an hour without board approval. Such increases, however, the board's order No. 30 states "shall not furnish a basis either to increase price ceilings of the commodity or service involved or to resist otherwise justified reductions in such price ceilings."

E. M. Boyd, vice president of the Northern Construction Co., M. C. Cameron and Brig. Gen. N. D. Lambert have jointly purchased the interests of the late General J. W. Stewart and A. R. Mann in the business of the Northern Construction Co. and J. W. Stewart, Ltd., one of the largest construction firms in Canada. The purchase also involves the North Western Dredging Co., owned by the firm. The Northern Construction Co. of Vancouver, B. C., also owns the West Construction Co. of Boston and Seattle. This subsidiary company is now carrying out major contracts for railway construction in the Alaska area. At present the firm is undertaking contracts in the British Columbia region for the Navy, Air Force, Department of Public Works, and Burrard Dry Dock Co., which entail a total expenditure of several millions of dollars. Brig. Gen. Lambert is deputy quarter-master-general of the Canadian Army for the duration of the war. His headquarters is in Ottawa. Mr. Boyd and Mr. Cameron are located at the company's offices at Vancouver, B. C.

The Canadian Construction Association has presented a brief to the National War Labor Board of Canada, listing several suggestions, among them: That a system of conferences between employees and employers should be instituted as a means of avoiding strikes; all manual workers on construction work should be paid a cost-of-living bonus; that all governmental controls and regulations affecting the construction industry should be removed or reduced to a minimum at the end of the war; that payment of the cost-of-living bonus should be made mandatory where it is now only permissive; that action be taken by the National War Labor Board to insure that there shall be no deficiency of labor on defense projects; and that trade unions be either registered or incorporated.

Despite wartime materials and manpower shortages, the North Carolina Highway and Public Works Commission during 1942 built or improved 770 miles of highways and increased by 1.5 percent the hard surfaced roads in the state, according to figures released by James S. Burch, of Raleigh, the Commission's statistics and planning engineer.

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MEETINGS

AMERICAN SOCIETY OF CIVIL ENGINEERS, summer meeting, Biltmore Hotel, Los Angeles, Calif., July 28-30.

REGIONAL AND LOCAL MEETINGS

NORTH CAROLINA LEAGUE OF MUNICIPALITIES, annual meeting, Raleigh, N. C., Aug. 12-13.

NEW ENGLAND WATER WORKS ASSOCIATION, Hotel Statler, Boston, Mass., Sept. 28-29.

Elections and Activities

THE BIRMINGHAM, ALA. Engineers Club has elected the following officers and directors: R. A. Polglaze, president, succeeding Percy G. Cowin; Ernest D. Scott, vice-president; J. T. Benton, secretary-treasurer; directors: R. S. Poor, Herbert S. Kent and E. J. McCrossin, Jr. The club decided to open an office in the Brown-Marx Building June 1, in charge of a full time paid secretary. Erskine Ramsay, widely known local mining engineer and philanthropist, will finance the operation of the office for the next year, after which it will be maintained jointly by all engineering organizations in the city.

AT THE ANNUAL MEETING of the St. John, N. B., branch of the Engineering Institute of Canada, A. O. Wolff was elected chairman. He succeeds D. R. Smith, C. D. McAllister was named vice chairman and G. L. Phillips became secretary-treasurer. The new executive committee consists of the officers and D. R. Smith, C. C. Purdy, G. W. Griffin, and G. M. Brown.

A. O. WOLFF, of St. John, N. B., has been named president of the New Brunswick branch of the Engineering Institute of Canada.

DAVID LIGHTBODY has been elected president of the newly formed House Builders' Association at New Westminster, B. C. Frank Bond was named vice president, L. B. Lusby, secretary-treas-

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La., New Orleans—R. S. Maestri, pres. Sewer & Water Bd., water facilities, $109,973. Applied to FWA. A. B. Wood, 526 Carondelet St., engr.

†Ohio—U. S. Eng., 925 New Federal Bldg., Pittsburgh, Pa., plans completed, 21 x 36 ft. pumphouse, 60 x 60 ft., rein.-con. reservoir and equip. for bldg., Cuyahoga Co. $60,000. Wilbur Watson & Associates, 4614 Prospect Ave., Cleveland, engrs.

O., Elyria—City, L. D. Faxon, Serv. Dir., City Hall, completed plans 1,500 ft. 42 in. intake pipeline, Havens & Emerson, Leader Bldg., Cleveland, consult. engrs.

O., Mansfield—City Council authorized purchasing 10 acres land for deep water well near Lexington. $25,000.

O., Steubenville—City, E. Brandfess, service dir., waterworks rebuilding and addn. (**Correction**—Project in abeyance). CD 6/9—ENR 6/17.

O., Wooster—R. E. Fisher, mayor, drilling second city well, Killbuck valley. $25,000.

†Tenn., Columbia—Columbia Water Co., R. W. Williamson, mgr., Columbia, expanding, imprv. city water plant. $106,000. **FWA.** Freeland & Roberts Co., 3rd Natl. Bank Bldg., Nashville, engrs. CD 5/5—ENR 5/13.

†Washington—U. S. Eng., 800 3 Ave., Seattle, Zone 4, pumphouse, watermains, Neg. 626, Pierce Co.

BIDS ASKED

Bids Asked August 18

Ia., Des Moines—Bd. Water Works Trustees, 1003 Locust St., Sects. A, D and E, earthen dam forming impounding reservoir. Alvord, Burdick & Howson, 1401 Civic Opera Bldg., Chicago, Ill., engrs.; adv. ENR 7/15. CD 4/14—ENR 4/16.

LOW BIDDERS

†La., Alexandria—W. G. Bowden, mayor, June 30, pumphouse, Docket. La. 16-117, from B. Brezner, Alexandria, **$21,485. FWA.** CD 6/17—ENR 6/24.

CONTRACTS AWARDED

†Arkansas—U. S. Eng., 300 Broadway, Little Rock, drilling wells, Drew Co., to Layne-Arkansas Co., Stuttgart, under **$50,000.**

†California—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, water sys., Contr. 509-Eng-5105, Los Angeles Co., to C. B. Stratton, San Gabriel, under **$50,000.**

†California—U. S. Eng., 1209—8 St., Sacramento, Zone 8, water and sewer sys., Spec. 612, Nye Co., to E. T. Haas Co., Merchants Exchange Bldg., San Francisco, under **$25,000.**

†Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, drill, test, develop, sterilize well, Contr. 436-eng-9777, Dade Co., to Kiser Drilling Co., 401 N.W. 29 St., Miami, under **$50,000.**

†Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, water and sewage facilities, Neg-Jax-43-1138, Duval Co., to Boyd & Goforth, 1226 W. Forsythe St., Jacksonville, under **$50,000.** Awarded 6/28.

†Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, developing, sterilizing wells, Hillsborough Co., to M. R. Vaughn, 6819 Orange Blossom Ave., Tampa, under **$50,000.** Awarded 7/1.

†Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, water distr. lines, water serv. lines, etc., Contr. 436-Eng-10269, Lake Co., to Saine Co., Inc., 4511 French Ave., Jacksonville, under **$50,000.**

†Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, water and sewage facilities, Neg-Jax-43-1023, Monroe Co., to The Murphy Constr. Co., Cedar Ave., West Palm Beach, under **$50,000.** Awarded 6/24.

†Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, water distr. and water service lines, etc., Contr. 436-Eng-10256, Orange Co., to Saine Co., Inc., 4511 French Ave., Jacksonville, under **$50,000.**

†Florida—U. S. Eng. 575 Riverside Ave., Jacksonville, Zone 2, wells, Neg-Jax-43-1179, Orange Co., to Layne Atlantic Co., Orlando, under **$50,000.** Awarded 6/28.

†Fla., Miami—Dpt. Water & Sewers, P. O. Box 4821, imprv. water facilities, Fla. 8-235 (N.F.) Div. 1, pump house, to W. L. Hailey & Co., 1012 Cotton State Bldg., Nashville, Tenn., **$12,385***** Div. 2, 42 and 30 in. c.i. pipe, to U. S. Pipe & Foundry Co., St. Louis Ave., Bessemer, Ala., **$316,984***** Divs. 3 and 4, installing 30 and 42 in. c.i. mains, 12 ft. lengths, to Leach Constr. Co., 116 N. E. 29 St., **$154,440. FWA.** Grand total $483,809. Bids 6/29. CD 5/14—ENR 5/20.

†Georgia—U. S. Eng., Post Office Bldg., Savannah, water distr. sys., Contr. 819-Eng-1601, Houston Co., to J. B. McCrary Co., Inc., 22 Marietta St. Bl., Atlanta, under **$50,000.**

Ga., Augusta—City, E. E. Pund, city engr., concrete spillway and dam, to Guy E. Smith, 501 Broad St., about **$30,000.**

Ill., East Moline—A. Nichuas, city clk., 1 m.g. reservoir, to Dan Chrisitansen Constr. Co., 417 1st Ave. S.E., Cedar Rapids, Ia., **$28,920.** Bids 6/25.

Location of ENR Correspondents

Symbols and Abbreviations Include:

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD Engineering News-Record Construction Daily
A-E-M Architect—Engineer-Management type of contract.

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Named in order of Listing)

Water Supply	Unclassified
Sewers, Waste Disposal	Latin America
Bridges	Public Buildings
Streets & Roads	Commercial Buildings
Earthwork, Waterways	Industrial Buildings

Stages Reported

PROPOSED: (except Streets & Roads):

BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Note: To comply with censorship requirements, addresses on some reports are being generalized. Data which would reveal the purpose of the improvements and the size are withheld. The name of contractor and general area are reported.

†Indiana—U. S. Eng., 612 Federal Bldg., Louisville, Ky., well, Contr. 559-eng-6983, Bartholomew Co., to Layne-Northern Co., Inc., 227 W. Edwards St., Indianapolis, under **$50,000.**

Mich., Detroit—Dpt. Water Supply, 735 Randolph St., pump station, Modern and St. Aubin Aves. for Detroit-Highland Park water sys., to J. A. Utley, 723 E. Ten Mile Rd., Royal Oak, electrical work, to Gray Electric Co., Inc., 627 Jones St., Detroit. Est. **$150,000.** CD 4/16—ENR 4/22.

†New York—U. S. Eng., 120 Wall St., New York, Zone 5, imprv. water supply sys., Contr. 1097-eng-4108, Orange Co., to Carl Buhr, Inc., Grand Central Terminal, New York, under **$50,000.**

†North Carolina—U. S. Eng., 308 Customhouse, Wilmington, water sys., No. 982-43-258, Guilford Co., to Higgins & Gaines, Greensboro, less than **$50,000.** Bids 6/26. Awarded 6/26.

†North Carolina—U. S. Eng., 308 Customhouse, Wilmington, water supply sys., No. 982-43-236, Guilford Co., to Virginia Machinery & Well Co., Inc., 1319 E. Main St., Richmond, Va. Est. less than **$50,000.** Bids 5/28, awarded 6/18.

†North Carolina—U. S. Eng., 308 Customhouse, Wilmington, water treatment plant, Contr. 982-Eng-1877, Richmond Co., to Higgins & Gaines, Greensboro, **$100,000-$500,000.**

†Ohio—U. S. Eng., 522 U. S. Post Office & Courthouse, Cincinnati, installing miscellaneous water lines, Contr. 1945-Eng-454, Greene Co., to W. J. Lazynski, Inc., 802 E. Center St., Milwaukee, Wis., under **$50,000.**

†Oregon—U. S. Eng., Pittock Blk., Portland, flushing hydrants, Contr. 698-eng-3476, Deschutes Co., to Halvorson Constr. Co. & E. B. Halverson, 608 1st Natl. Bank Bldg., Salem, under **$50,000.**

†Oregon—U. S. Eng., Pittock Blk., Portland, repairing reservoir damage, Contr. 698-Eng-3455, Lane Co., to McNutt Bros., Eugene, **$50,000-$100,000.**

Ore., Reedsport—E. G. Dunn, mayor, City Hall, water lines, replacing mains, iron and wood pipes, own forces **$25,000.** H. T. Lewis, City Hall, city engr.

†Pennsylvania—U. S. Eng., Standard Oil Bldg., Baltimore, Md., excavation for watermains, water pipe, fire hydrants, etc., Contr. 174, Eng-2019, Berks Co., to Counties Contracting & Constr. Co., 1902 Cambria St., Phila., under **$50,000.**

†South Carolina—U. S. Eng., 33 Customhouse, Charleston, installing water treatment plant, Contr. 231-Eng-1515, Charleston Co., to Dorr Co., Inc., 570 Lexington Ave., New York, N. Y., under **$50,000.**

†South Carolina—U. S. Eng., 33 Customhouse, Charleston, bldg. for water treatment plant, Charleston Co., to Simons-Mayrant Co., 16 Broad St., Charleston, approx. **$22,000.** Awarded 6/30.

S. D., Pierre—D. W. Loucks, state engr., Pierre, drilling artesian well on capitol grounds, to Sterling Norbeck, Redfield, **$15,000.**

†Texas—U. S. Eng., San Antonio, dismantling and re-erection of tank, Contr. 2161-eng-1391, Bexar Co., to V. Prassel, 116 Cardinal St., San Antonio, under **$50,000.**

†Texas—U. S. Eng., 416 Wright Bldg., Tulsa, Zone 2, Okla., addnl. facilities, water distr. sys., fencing, automatic sprinkler sys., etc., Sol. 957-Neg-43-266, Dallam Co., to J. O. Boud Constr. Co., P. O. Box 1343, Dallas, **$50,000-$100,000.** CD 5/10—ENR 5/13.

†Texas—U. S. Eng., Fort Sam Houston, water distr. sys., Kinney Co., to Waco Constr. Co., 1201 Med. Arts Bldg., Waco, under **$50,000.**

†Texas—U. S. Eng., Fort Sam Houston, automatic sprinkler sys., McCulloch Co., to Automatic Sprinkler Corp., 3923 McKinney St., Houston, under **$50,000.**

★**†Tex., Corpus Christi** — Federal Works Agency, 702 Electric Bldg., Fort Worth, Contr. 1, pump. plant and 10 m.g. reservoir, Tex. 41-907 FA, to Aikin & Hinman, 1001 S. Porter St., **$311,664;** Contr. 2, 16 mi. 39 in. water pipeline, concrete, to Brown & Root, Inc., 1501 Mussett St., **$940,725.** Bids 5/27, awarded 7/3. CD 6/9—ENR 6/17.

†Utah—U. S. Eng., 32 Exchange Pl., Salt Lake City, water softener and treatment plant, Box Elder Co., to Corey Joslin Inc., 50 Hawthorne St., San Francisco, Calif., under **$50,000.** Bids 6/28.

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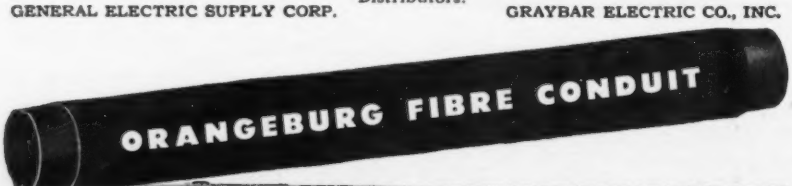

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SEWERS, WASTE DISPOSAL

PROPOSED WORK

Conn., New Britain—C. P. Wks. Dpt., City Hall, sewers, northwestern section. $75,000.

†**Conn., Southington**—F. J. Hurley, supt. Sewers, Town Hall, sewers, sewage disposal plant addn. for housing, $35,000.

Ky., Lyndon—Commonwealth of Kentucky, Frankfort, sewage disposal plant. $75,000. Preston S. Sinton, Frankfort, engr.

N. Y., Great Kills—Dpt. Sanitation, Municipal Bldg., New York, unloading plant, Great Kills Park, $350,000.

O., Euclid—City, F. Spino, Serv. Dir., 585 E. 222 St., sewer line. Over $50,000. F. A. Thomas, city engr. Havens & Emerson, Leader Bldg., Cleveland, consult. engrs.

O., Elyria—City, L. D. Faxon, Serv. Dir., City Hall, storm water sewers, Wm. Dutch, city engr. Havens & Emerson, Leader Bldg., Cleveland, consult. engrs.

★**Tex., San Antonio** — G. B. Mauermann, mayor, Proposal 2, sanitary sewerage sys. imprvs., disposal plant units, etc., $440,000; Proposal 3, sanitary sewerage sys. collection mains, $750,000. FWA funds applied for. T. Coghill, City Hall, city engr. Freese & Nichols, 407 Capps Bldg., Fort Worth, engrs. CD 6/24—ENR 7/1.

Wis., Beloit—A. D. Telfer, city mgr., storm sewers, Keeler and Park Aves. $32,800. W. Collins, acting city engr.

Wis., Brookfield—Greenfield Heights Sanitary Dist., V. A. Betts, secy., R 5, Waukesha, 7,000-10,000 ft. 6 and 8 in. sanitary sewers, sewage treatment plant. H. C. Webster & Son, 739 W. 2 St., Milwaukee, engrs. CD 3/30—ENR 4/1.

Ont., London—Interceptor sewer, Victoria St. $28,000. R. Garrett, City Hall, engr.

BIDS ASKED

Bids Asked July 20

N. Y., Kew Gardens—President Queens Boro, Queens Boro Hall, 120-55 Queens Blvd., sewer, appurtenances, Melvina Pl.; sanitary sewers, appurtenances, 24 Ave. and 128 St.; combined sewer, appurtenances, 164 Pl., 164 St., east side, 164 St., west side, sanitary sewer, etc. 114 Dr., 119 Rd., 180 St., 145 Ave. (Cogswell St.) 160 St., Claude Ave., Dillon St., 169 St., 179 (Grace) St., Bascom Ave., Merrick Blvd., Brinkerhoff Ave., etc.

Bids Asked July 21

†**Conn., Bridgeport**—City, Hy. Com., City Hall, State St., Contr. 6, 4,600 ft. 8- to 48-in. sanitary trunk sewers, laterals, appurtenances, Seaview and Connecticut Aves., Conn. 6-197. Over $25,000. FWA. H. L. Rowland, City Hall, engr.; adv. ENR 7/15. CD 6/24—ENR 7/1.

Ky., Hopkinsville—Commonwealth of Kentucky, c/o P. S. Sinton, engr., 110 New State Bldg., Frankfort, sewage disposal plant, $75,000. CD 7/13.

Bids Asked

†**La., New Orleans**—City, Municipal Utility Bd., sanitary sewer collection lines, imprvs., La. 16-243. $131,600. FWA. A. B. Wood, 526 Carondelet St., genl. supt. Sewerage & Water Bd. CD 5/25—ENR 5/27.

Pa., Meadville—American Viscose Corp., J. L. Shade, purch. agt., Delware Trust Bldg., Wilmington, Del., sewage disposal plant addn., trickling filter, steel rein.-con. work excavating, etc. Havens & Emerson, 1140 Leader Bldg., Cleveland, O., engrs.

LOW BIDDERS

†**Georgia**—U. S. Eng., Post Office Bldg., Savannah, June 25, sewage disposal plant. Thomas Co., from Arthur Pew Constr. Co. 2117 Piedmont Rd. N.E., Atlanta.

†**Ky., Morganfield**—Federal Works Agency, 20 N. Wacker Dr., Chicago, Ill., July 2, sewerage sys., disposal plant, KY.15-152, Sec. 1, from D. L. Amici Co., 900 Des Plaines, Forest Park, Ill., $79,526. Sect. 2, from Buesching Bros., 219 E. Berry St., Fort Wayne, Ind., $73,593. CD 6/22—ENR 6/24.

†**Texas**—U. S. Eng., 25 St. and Avenue F, Galveston, addnl. drainage sys., 51,500 cu. yd. excavation, 2,300 lin. ft. 18- to 30-in. concrete pipe, Sol. 359-43-C164, Hidalgo Co., from H. B. Combs, Edinburg, under $50,000.

†**Tex., Fort Worth**—S. H. Bothwell, city mgr., June 29, tunnel sewer, Tex-41-211, from J. G. Bartholomew, Construction Bldg., Dallas, Alt. B, precast pipe, $159,961. Est. $200,000. Freese & Nichols, Capps Bldg., engrs. CD 6/24.

†**Tex., Forth Worth**—S. H. Bothwell, city mgr., tunnel sewer, Tex. 41-211, Contr. 2, from Stiers Bros. Constr. Co., 3920-44 Magazine St., St. Louis, Mo., base bid (monolithic) $199,794. FWA. CD 6-24—ENR 6/10.

Wash., Seattle—City, County-City Bldg., July 1, sewer lines in 35 Ave. W., from M. Malaspina, 1803-30 Ave. S., $25,364. CD 6/23.

CONTRACTS AWARDED

†**Arkansas**—U. S. Eng., U. S. Post Office and Courthouse, Vicksburg, Miss., outfall sewer extens., Jefferson Co., to E. O. Korsmo

SEWERS (Contracts Awarded, Cont'd.)

Constr. Co., 73-74 Porter Bldg., Memphis, Tenn., under **$50,000.**

†Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, outfall sewer exten., Neg-Jax-43-1182, Hillsborough Co., to Edward S. Moore & Son., St. Petersburg, under **$50,000.** Awarded 6/29.

†Texas—U. S. Eng., 416 Wright Bldg., Tulsa, Zone 2, Okla., incinerator, Sol. 957-New-43-308, Gray Co., to J. Ted. Wilkerson, 1628 N.W. 23 St., Oklahoma City Okla., under **$50,000.**

†Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, sewer, Neg-Jax-43-1181, Sarasota Co., to J. B. Green Plumbing & Equip. Co., Sarasota, under **$50,000.** Awarded 6/26.

†Illinois—U. S. Eng., 520 Merchandise Mart, Chicago, storm drain sys., Contr. 1088-Eng-2024, Lawrence Co., to Gjellefald Constr. Co., Inc., Forest City, Ia., **$50,000-$100,000.**

Md., Baltimore—Bd. Awards, City Hall, vitr. sewers, etc., Contr. 359, to John Matricciani, 229 S. Exeter St., **$47,047,** Former low bid withdrawn. CD 5/17—ENR 5/20 under LB.

†Massachusetts—U. S. Eng., 31 St. James Ave., Boston, sewage treatment facilities, No. 175-43-Neg 397, Barnstable Co., to Ley Construction Co., 1215 Main St., Springfield, Est. **$50,000-$100,000.**

Michigan—State Hy. Dpt., Lansing, outlet sewer to pumphouse at Schaefer and Butler Rds., vicinity Detroit, Wayne Co., to A. Arcari, Goddard Rd. and Penn R.R., Route 5, Lincoln Park, **$198,975.** Bids 6/30. CD 6/25.

Mich., Dearborn—Sanitary lateral sewers, Sect. 1, to Angelo D. Ponio, 16595 Prest Ave., Detroit, **$25,488;** Sect. 2, to Drainage Contractors, Inc., 14375 Schaefer Rd., Detroit, **$44,419.**

†Mich., Inkster — Village, sanitary lateral sewers, Sect. 1, to King & De Pompolo, 439 Penobscot Bldg., Detroit, **$42,900*****Sects. 2 and 3, to A. Rossi, 30294 Seven Mile Rd., Farmington, **$45,041** and **$52,600** respectively*** Sect. 5, to Birmingham Constr. Co., 208 Hanna Bldg., Birmingham, **$39,000.** Grand total $179,-541. Bid 6/18. CD 6/11.

Pa., Callery—Mine Safety Appliances Co., Geo. H. Deike, pres., 220 Braddock Ave., Pittsburgh, sewage disposal plant, Imhoff tank, trickling filter, rotating arm and sludge bed, to E. H. Dobson, 145 Westland Dr., Pittsburgh. Est. **$30,000.** Bids 4/6. CD 3/30—ENR 4/1.

†Texas—U. S. Eng., Fort Sam Houston, incinerator, Bell Co., to Baugh & Scott, 1107 Frost Bank Bldg., San Antonio, under **$50,000.**

BRIDGES

PROPOSED WORK

Que., Thetford Mines—Viaduct, Dundas St.

BIDS ASKED

Bids Asked July 22

†Virginia—At office H. J. Spelman, dist. engr., Pub. Roads Admin., 1440 Columbia Pike, Arlington, Project VA DA WR-21, Bridge 104, Henry G. Shirley Memorial Hy. **FWA;** adv. ENR 7/15.

Bids Asked August 2

★**Tex., Langtry**—Southern Pacific Lines, c/o R. W. Barnes, ch. engr., 916 Southern Pacific Bldg., Houston, bridge over Pecos River on T. & N. O. R.R., near here, bids (1) grading (2) rein.-con. substructure (3) superstructure, structural steel cantilever type. $2,000,000. Modjeski & Masters, State Street Bldg., Harrisburg, Pa., consult. engrs.

LOW BIDDERS

Michigan—State Hy. Comn., Lansing, June 30, fabricating, furnishing structural steel for highway underpass, also grade separation for Ford Motor Co., gate underpass, vicinity of Detroit, Wayne Co., from American Bridge Co. 9-255 General Motors Bldg., Detroit, $34,515 and **$45,802** respectively. CD 6/24.

New York—State Dpt. P. Wks., Div. Hys., Albany, C. H. Sells, supt. P. Wks., June 30, bridge pier reconstruction Saratoga-Saratoga Lake Hy., from Collins Bros., Mechanicville, $71,686. Est. $81,751. CD 6/22—ENR 6/24.

CONTRACTS AWARDED

†Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, bridge constr., widening, resurfacing road, Neg-Jax-43-1137, Dade Co., to W. T. Price Dredging Corp., 3200 S.W. 27 St., Miami, under **$50,000.** Awarded 6/30.

New Mexico—State Hy. Comn., F. M. Limbaugh, engr., Santa Fe, fifteen 50 ft. span concrete, treated timber bridge, Eddy Co., to J. H. Ryan, 413 South Bryn Mawr St., Albuquerque, **$145,331.** Est. $120,000. Bids 7/6. CD 6/22—ENR 6/24.

STREETS AND ROADS

BIDS ASKED

Bids Asked July 19

N. Y., Niagara Falls—Bd. Supervs. Niagara Co., Lockport, grading, foundations, structural work for Grand Island Bridge approach. Over $25,000.

Bids Asked July 20

Kansas—State Hy. Dpt., Meade, single asphalt surface treatment 13.12 mi. P. 6748-AB, Meade Co.; 12.216 mi. P. 6760, Ford Co.; 11.02 mi. P. 6762-AB, Grant Co.; 33.039 mi. P. 6761-ABCEE, Meade Co.; 21.833 mi. No. 6763-ABCD, Seward Co.; light type surfacing 8.021 mi. P. K-6062; 9.684 mi. P. K-6063, both Morton Co. R. C. Keiling, Topeka, engr.

Virginia—State Hy. Dpt., Richmond, furnishing, del., applying 6,697 tons bituminous plant-mixed materials.

West Virginia—State Rd. Comn., D. McClaugherty, secy., Charleston, surface treatment 10.82 mi. Philippi-Belington Rd. US Route 250, SP 16, 27, 91 and 3018; 4.47 mi. Junct. US 119-Ebenezer Church Rd., State Route 57, SP 3475 and 3453, both Barbour Co.; 10.88 mi. Buckhannon-Ellamore Rd., US Route 33, SP 198-A, Upshur Co.; 7.5 mi. Williamsport toward Martinsburg Rd., SP 2171 A and B, Berkeley Co.; 8.07 mi. Charles Town-Berkeley Co. line Rd., State Route 9, US Route 11 and SP 3026 A and B, Jefferson Co.; 8.8 mi. Ona-Junction Secondary Route 47 Rd., State Secondary Proj. 5595, Cabell Co.; 6.71 mi. Andrew-Jct. W.Va. 3, US Route 119, SP 3036 and 3529, Boone Co.; 1.68 mi. Sattes-Nitro Rd., State Route 25, SP 2265; 5.3 mi. Marmet-C&O Underpass State Route 61, SP 3398-B; 7.4 mi. Indian-Quick Rd., Secondary Route 49, State Secondary Proj. 5076; 4.4 mi. Leewood-Decota Rd., Secondary Route 76, State Secondary Proj. 5268; 4.2 mi. Leewood-Kayford Rd., Secondary Route 79, State Secondary Proj. 5267; 20 mi. Ward-Mammoth Rd., Secondary Route 81, State Secondary Proj. 5259, all foregoing Kanawha Co.; 11.62 mi. Kanawha Co. line-Yawkey Road State Route 13, SP 3462 A and B, 6 mi. Midkiff-Ranger Rd., State Route 10, SP 2164, both Lincoln Co.; 3.5 mi. Putnam Co. line-Arbuckle Rd., US Route 35, SP 3352-B, Mason Co.; 3 mi. Buffalo-Mason Co. line Rd., US Route 35, Putnam Co.; 3.49 mi. Simmons-Dolph Rd., US Route 52, SP 215 B and F, Mercer Co.; 6.2 mi. Glen Daniel to Wyoming Co. line Rd., Secondary Route 15, State Secondary Route 15, Raleigh Co.; 7.5 mi. Junction W. Va. 73-Gum Springs Rd. US Route 119, SP 2240, 2222, 3477, Monongalia Co.; 13.6 mi. Rock Camp-Peterstown Rd., US Route 219, SP 3304 A and B, Monroe Co.; 12.2 mi. Nettie-Leivasy-Greenbrier Co. line Rd., State Route 20, SP 217-A and 217-C; 7.12 mi. Canvas-Nettie Route, State Route 20 and SP 216-B, both Nicholas Co.

Bids Asked July 22

Kansas—State Hy. Dpt., Smith Center, single asphalt surface treatment 17.955 mi. P. 37332, Gove Co.; 2.01 mi. P. 3733, Logan Co.; 23.252 mi. P. 3731, Phillips Co.; 13.6 mi. P. 3741, Russell Co.; resurfacing material 12.396 mi. P. 3738-ABC, 4.769 mi. P. 3737, both Decatur Co.; 9.728 mi. P. 3734 AB Norton Co., 1.157 mi. P. 3736, 5.252 mi. P. 3735, both Sheridan Co.; 14.41 mi. P. 3739, Smith Co.; 12.192 mi. P. 3740, Thomas Co.; light type surfacing 4.01 mi. P. K-3094, Osborne Co.; 15.39 mi. P. K-3095, Smith Co. R. C. Keiling, Topeka, engr.

North Carolina—State Hy. & P. Wks Comn., Raleigh, grading, T.B. macadam and bituminous surface treatment 1.28 mi. from Summit Ave. along Textile Dr. to Broad St., in Greensboro and along Broad St. to Bessemer Ave., County Proj. 355, Guilford Co. $25,000-$50,-000. W. V. Baise, hy. engr.

Bids Asked July 23

Ia., Indianola—Bd. Supervs. Warren Co., furnishing, hauling, placing 13,250 cu.yd. Class A crushed stone various truck and local roads. Over $25,000. S. J. Nelson, co. engr.

Bids Asked July 27

Washington—State Hy. Dpt., Olympia, surfacing 7.6 mi. road between Sheridan Hill and Traceytown, 2 mi. between Illahee and Brownsville, 6 mi. on Valley Rd. and 7.4 mi. in Bremerton vicinity, Kitsap Co.; 6 mi. primary State Hy. 7 and 23.1 mi. secondary Hy 4B, Odessa to Wilbur, Lincoln Co.; 4.5 mi. Primary State Hy. 6 west branch to Pend Oreille State Park, Spokane and Pend Oreille Counties. B. Bantz, hy. dir.

Bids Asked July 28

California—State Div. Hys., G. T. McCoy, engr., Sacramento, placing plant mix material about 3 mi. between Santa Rita and San Benito River, Monterey and San Benito Counties; repairing with plant mix material portions 10.2 mi. hy. between Morgan Summit and Deer Creek Hy., Tehama Co.

Bids Asked July 29

California—State Div. Hys., G. T. McCoy, engr., State Bldg., Los Angeles, placing plant mix material and applying seal coat 41.4 mi. hy. between San Diego Co. line and Corono and between Elsinore and Route 19, Riverside Co.

†R. I., Newport—City, Dpt. Streets & Hys., City Hall, paving, storm and sanitary sewers in Hillside Ave., Beacon St., RI 37151. $44,000.

Bids Asked July 30

Kentucky—Dpt. Hys., Frankfort, bituminous resurfacing 9 mi. Pineville-Harlan Rd., SP 7-64, SP 48-165, Bell and Harlan Counties, 1.3 mi. Catlettsburg-Louisa Rd., SP 10-105, Boyd Co., 20 mi. Stanford-Somerset Rd., SP 69-90, Lincoln Co., 14.264 mi. Somerset, Stanford Rd., SP 100-35, Pulaski Co., 0.966 mi. U.S. 68, SP 115-129, 115-49 and 115-69, Washington Co.; high type surfacing 4.24 mi. road, SP 8-270, SP 59-215, Boone and Kenton Counties; grading, draining, medium type surfacing 0.312 mi Catlettsburg-Louisa Rd., Boyd Co.; grading, drainage, low type surfacing

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STREETS and ROADS (Bids Asked, Cont'd.)

1.155 mi. Graham-Pleasant Valley Rd., SP 22-88, 5.4 mi. Soldier-Olive Hill Rd., SP 22-218, both Carter Co., low type surfacing 11.95 mi. Smith Mills-Mt. Vernon Ferry Rd., SP 51-239, SP 51-259, Henderson Co., rock asphalt seal 4.478 mi. London Corbin Rd., SN-SP 63-111, 63-131, 63-151, Laurel Co.; bituminous concrete resurfacing 1.488 mi. Park Ave. in Paducah, SN-SP 73-172, McCracken Co.; 348 ft. concrete crib wall at L & N tracks on Battyville-Jackson Rd., MP 65-29E, Lee Co.

Bids Asked

Alabama — State Hy. Dpt., Montgomery, grading, drainage, gravel surfacing 3.985 mi., FAP-150-A(4), Tuscaloosa Co. Extended date. Plans deposit $10. CD 6/8—ENR 6/10.

Iowa—State Hy. Comn., Ames, rejected bids June 29, imprv. 7.8 mi. M-3280 and 8.4 mi. M-3281, both Clay Co.; grading 55,530 cu. yd. FN-371, Clayton Co. CD 6/18—ENR 6/24.

Kentucky—Dpt. Hys., Frakfort, rejected bids June 25, imprv. 4.478 mi. road, Laurel Co. Will readvertise. CD 6/29—ENR 7/1 under LB.

†**Louisiana**—U. S. Eng., 25 St. and Avenue F, Galveston, Tex., received no bids June 29, concrete and asphalt paving, Solic. 359-43C-162, East Baton Rouge Parish. CD 6/25.

La., Jennings—Police Jury of Jefferson Davis Parish and Mayor and City Council, rejected bids May 20, paving imprvs., certain streets. CD 5/27—ENR 6/10 under LB.

Maryland—State Rd. Comn., Baltimore, recinded and abandoned contract imprv. 3.138 mi. Anne Arundel Co. CD 4/23—ENR 4/29, under LB.

Oregon—State Hy. Comn., Portland, rejected bids July 17, imprv. 0.4 mi. road, Coos Co. Will readvertise in August. CD 7/12.

LOW BIDDERS

California—State Hy. Dpt., 808 State Bldg., Los Angeles, July 1, imprv. 15.9 mi. San Diego Co., from Southwest Paving Co., 11402 Texford St., Roscoe (Los Angeles), **$104,643.** CD 6/11—ENR 6/17.

California—State Div. Hys., Sacramento, July 7, imprv. 28.3 mi. Shasta and Siskiyou Counties, also 9.7 mi. Colusa Co., from Clements & Co., 941 Atherton St., Hayward, **$135,471** and **$55,750** respectively***roads in Butte, Placer, Sacramento, Yolo, Colusa, Glenn, Yuba and Sutter Counties, from W. C. Railing, 27 Lowell St., Redwood City, **$36,398*****21 mi. Navada, Placer and Sierra Counties, from Louis Biasotti & Son, 40 W. Clay St., Stockton, **$25,762*****9 mi. Humboldt Co., from Marshall S. Hanrahan, Box 429, Redwood City, **$147,200*****8.8 mi. Plumas Co., from Isbell Constr. Co., 1300 E 4 St., Reno, Nev., **$48,265*****5.2 mi. Sutter Co., from Hemstreet & Bell, 12 and F Sts., Marysville, **$33,525.** CD 6/21—ENR 6/24.

★**Michigan**—State Hy. Comn., Lansing, June 30, imprv. 0.908 mi. SN-F82-74C-3; SN-F 82-114C-1 and 1.02 mi. SN-F82-49C-1; SN-F82-74C-2, from W. Pierson, 2236 Delaware Blvd., Saginaw, **$455,895** and **$482,447** respectively. CD 6/24.

Nebraska—State Dpt. Roads & Irrigation, Lincoln, July 8, imprv. 1.3 mi. Maintenance Patrol 66817 and 66851, from Bushman Constr. Co., 1801 S. 8 St., St. Joseph, Mo., **$61,279.** CD 6/30.

O., Cleveland—Bd. Comrs. Cuyahoga Co., G. H. Stahler, clk., June 29, 2 in. asphaltic concrete paving, etc., 5,000 cu. yd. Warrensville Center Rd., from W. L. Schloss, McCracken Rd. and Penna. R. R., **$128,191.** Est. $130,900. CD 6/23.

Oregon—State Hy. Comn., Pub. Serv. Bldg., Portland, July 7, 11,400 yd. crushed rock, Deschutes and Lane Counties, from J. S. Risley, Milwaukee, **$48,000.** CD 6/29—ENR 7/1.

Tennessee—State Hy. Dpt., Nashville, July 2, grading, draining, 2 bridges 2.727 mi. State Route 76, F.A.P. 280-J(1), from Oman Constr. Co., Acklen Park, Nashville, **$216,929.** CD 6/22—ENR 6/24, under Bridges.

Washington—B. Bantz, dir. Hys., Olympia, June 29, imprv. 1.9 mi. Snohomish Co., from Paine & Gallucci & Harrison Bros. Co., 1521 S. Grant Ave., Tacoma, **$76,037.** Received no bids June 29, imprv. 1.9 mi. Pacific Co. CD 6/22.

CONTRACTS AWARDED

†**Alabama**—U. S. Eng., Grant St. west of Westwood St., Mobile, grading, paving, Contr. 569-Eng-5181, Mobile Co., to Foster & Creighton Co., American National Bank Bldg., Nashville, Tenn., **$100,000-$500,000.**

★†**Arkansas**—U. S. Eng., 300 Bway., Little Rock, access roads, Sebastian Co., to Hill & Evans, Box 327, Fort Smith. Est. **$500,000.**

†**California**—U. S. Eng., 74 New Montgomery St., San Francisco, grading, paving, San Francisco Co., to Whalin Bros., 2942-23 Ave., Oakland. Awarded 7/2.

†**California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, surfacing roads, San Diego Co., to B. G. Carroll, 2260 Main St., San Diego, under **$50,000.** Awarded 6/28.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, roads, parking area, Neg-Jax-43-1117, Hillsborough Co., to James H. Craggs Constr. Co., Ocala, under **$50,000.** Awarded 6/28.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, road, bridges, parking area, Neg-Jax-43-1155, Lee Co., to Cone & Manly, Caesar St. and Cumberland Rd., Tampa, under **$50,000.** Awarded 6/24.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, roads, sidewalks, Neg-Jax-43-1012, Orange Co., to Langston Constr. Co., 15 W. Grant Ave., Orlando, under $500,000. Awarded 6/26.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, roads, walks, foot-bridges, Neg-Jax-43-1165, Pinellas Co., to W. H. Arnston Co., Inc., 357 Scotland Rd., Dunedin, under **$50,000.** Awarded 6/29.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, stabilization, paving, etc., Contr. 436-eng-10264, Palm Beach Co. to H. E. Wolfe Constr. Co., St. Augustine, **$100,000-$500,000.**

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, roads, Neg-Jax-43-1146, Dade Co., to W. T. Price Dredging Corp., 3200 S.W. 27 St., Miami, under **$50,000.** Awarded 6/26.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, roads, sidewalks, parking area, Neg-Jax-43-1171, Taylor Co., to Charles K. McCaskill, Jr., Perry, under **$50,000.** Awarded 6/26.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, roads, Neg-Jax-43-991, Hillsborough Co., to John W. Lyon & Co., Tampa, under **$50,000.** Awarded 6/28.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, roads, parking areas, Neg-Jax-43-1094, Orange Co., to Langston Constr. Co., 15 W. Grant Ave., Orlando, under **$50,000.** Awarded 6/26.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, road, sidewalk, foot bridges, Neg-Jax-43-1156, Sarasota Co., to Cone & Manly, Caesar St. and Cumberland Rd., Tampa, under **$50,000.** Awarded 6/26.

Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, treatment of roads, Neg-M.I. 43-41, Dade Co., to Belcher Oil Co., 1217 Biscayne Blvd., Miami, under $500,000. Awarded 6/29.

†**Georgia**—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., paving, Contr. 569-Eng-5212, Chattahoochee Co., to Coffee Constr. Co., Eastman, under $50,000.

†**Georgia**—U. S. Eng., Post Office Bldg., Savannah, grading, draining, paving, Contr. 819-Eng-1596, Dougherty Co., to Wright Contg. Co., Columbus, **$100,000-$500,000.**

†**Idaho**—U. S. Eng., Pittock Blk., Portland, Ore., road, Contr. 698-Eng-3437, Bannock Co., to Morrison-Knudsen Co., Inc., 319 Bway., Boise, under **$50,000.**

†**Indiana**—U. S. Eng., 612 Federal Bldg., Louisville, Ky., surfacing, Contr. 569-Eng-6985, Marion Co., to Grady Bros. Constr. Co., 309 N. Wash. No. 206 St., Indianapolis, under **$50,000.**

In., Eldora—Bd. Supervs. Hardin Co., surfacing 92.225 mi. secondary roads, to Beu & Sons, Summer, **$39,308.** Awarded 6/25. CD 6/16.

†**Kansas**—U. S. Eng., 10 E. 17 St., Kansas City, Mo., palliative surfacing, Wyandotte Co., to Bowen Co., 1914 Highland St., Kansas City, Mo. Est. under **$50,000.**

†**Kentucky**—U. S. Eng., 612 Federal Bldg., Louisville, surfacing, Contr. 559-Eng-7011, Union Co., to Shumaker Bros., 2075 Martindale Ave., Indianapolis, Ind., under **$50,000.**

†**Louisiana**—U. S. Eng., 300 Bway., Little Rock, Ark., concrete roads, Rapides Parish, to A. C. Campbell Constr. Co., 86 Crockett St., Shreveport, under **$200,000.** Awarded 6/30.

†**Louisiana**—U. S. Eng., 300 Bway., Little Rock, Ark., surfacing addnl. roads, Rapides Parish, to Barber Bros. Co., Reymond Bldg., Baton Rouge, under **$400,000.** Awarded 6/30.

†**Maine**—U. S. Eng., 31 St. James Ave., Boston, Mass., temporary roads, No. 175-4 3-NEG 382, Aroostook Co., to Lane Constr. Corp., 37 Colony St., Meriden, Conn. Est. under **$50,000.** Bids 6/28. CD 6/25—ENR 7/1, under Pub. Bldgs.

†**Massachusetts**—U. S. Eng., 31 St. James Ave., Boston, roads and drainage work, No 175-43-Neg 394, Barnstable Co., to Merry Contractors, Merry Ave., Duxbury. Est. under **$50,000.** CD 7/1—ENR 7/8.

†**Massachusetts**—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., roads, walks, driveways, parking areas, Bristol Co. to Thomas Bros., 277 Wareham St., Middleboro. Est. **$50,000-$100,000.**

†**Massachusetts**—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., road, No. 43-272, Hampden Co., to E. B. McGurk, Inc., 355 Barbour St., Hartford, Conn. Est. **$50,000.**

†**Mass., Springfield**—City Hy. Dpt., imprv. paving Goodwin St., own forces, under **$50,000. FWA.**

Mich., Wyandotte—Wayne Co. Road Comn., Barium Tower, Detroit, reconstructing concrete pavement, North Lane, to Denton Const. Co., 7-170 General Motors Bldg., Detroit, **$80,885.**

Minnesota—State Hy. Dpt., St. Paul, to C. L. Nelson Co., Brainerd, and R. C. Jones, Deerwood, imprv. 12 mi. S.P. 1301-03, **$70,914**; 3.1 mi. S.P. 3307-13, **$29,960**; 8.5 mi. S.P. 6920-11, **$38,210.** Grand total $139,084. Bids 6/25. CD 6/9—ENR 6/17.

STREETS and ROADS (Contracts Awarded, Cont'd.)

Minn., Duluth—St. Louis Co., seal coating about 29 mi. bituminous surface, to Ashworth-Hawkinson Co., St. Louis Park, **$33,858.** Bids 6/22.

†**Mississippi**—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., grading, paving, Contr. W-569-Eng-5202, Lowndes Co., to Mid-South Paving Co., P. O. Box 234, Jackson, **$100,000-$300,000.**

†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, bituminous road constr., Brown Co., to Lee & Johnson, 215 Ins. Exchange Bldg., Sioux City, Ia. Est. under **$50,000.**

†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, bituminous road construction, Hall Co., to J. H. Healy Const. Co., Sioux Falls, S. D., under **$50,000.**

†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, bituminous road constr., Lancaster Co., to Kingery Constr. Co., 1941 Y St., Lincoln. Est. under **$50,000.**

†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, bituminous road constr., Scottsbluff Co., to Inland Constr. Co., 3867 Leavenworth St., Omaha. Est. under **$50,000.**

†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, reconstructing, resurfacing, Contr. 64-3-Eng-4194, Thayer Co., to Inland Constr. Co., 3837 Leavenworth St., Omaha, under **$50,000.**

Nebraska—State Dpt. Roads & Irrigation, Lincoln, imprv. 5.4 mi. DA-WR 13, to Roush Constr. Co., Gillette, Wyo., **$45,059*****3.1 mi. DA-WR10, to Roberts Constr. Co., 1018 Term. Bldg., Lincoln, **$30,822*****4.9 mi. DA-WR11, to W. A. Bibb Eng. Co., Geneva, **$43,077.** Grand total $118,958. Bids 7/8. CD 6/30.

†**New Hampshire**—U. S. Eng., 31 St. James Ave., Boston, Mass., concrete paving, construction work, Rockingham Co., to Conti & Donahue, 138 Liberty St., Lynn, Mass. Est. under **$50,000.**

†**New Jersey**—U. S. Eng., 120 Wall St., New York 5, N. Y., resurfacing, Contr. 1097-Eng-4140, Middlesex Co., to Chas. F. Vachris, Inc., 827 Remsen Ave., Brooklyn, N. Y., under **$50,000.**

†**New Jersey**—U. S. Eng., 6 and Walnut Sts., Phila., Pa., reconstructing road, Contr. 697-Eng-3881, Burlington Co., to Robert W. Cleveland & Co., 19 N. Harrison St., East Orange, under **$50,000.**

†**New Jersey**—U. S. Eng., 120 Wall St., New York 5, N. Y., roads, Somerset Co., to Union Bldg. & Const. Co., 631 Main St., Passaic. Est. **$100,000.**

†**New Mexico**—U. S. Eng., Albuquerque, addnl. paving, De Baca Co., to Brown Bros., 3525 N. 4 St., Albuquerque, **$50,000-$100,000.**

New Mexico—State Hy. Comn., F. M. Limbagh, engr., Santa Fe, imprv. 8.679 mi. Santa Fe and San Miguel Counties, to D. D. Skousen Co., Albuquerque, **$380,630.** Est. $550,000. Bids 7/6. CD 6/22—ENR 6/24.

†**New York**—U. S. Eng., Chimes Bldg., Syracuse, addnl. paving, drainage, Contr. 321-eng-936, Franklin Co., to Louis Longhi & Son, Glens Falls, **$50,000-$100,000.**

★†**New York**—U. S. Eng., 120 Wall St., New York, Zone 5, roads, curbs, walks, Contr. No. 1097-Eng-4143, Orange Co., to Chas. F. Vachris, Inc., and Tufano Contr. Corp., 827 Remsen Ave., Brooklyn, **$500,000-$1,000,000.** CD 6/25.

†**North Carolina**—U. S. Eng., 308 Customhouse, Wilmington, paving, grading, draining, repairing entrance Rds. 1 and 2, Iden. Serial No. 982-43-244 Durham Co., to F. D. Cline, Fairview Rd., Raleigh, less than **$100,000.** Bids 6/18, awarded 6/24.

†**North Carolina**—U. S. Eng., 308 Customhouse, Wilmington, repairing road intersections, Onslow Co., to Grannis, Higgins, Thompson & Street, Builders Bldg., Charlotte, less than **$50,000.** Bids 6/26, awarded 6/29.

Ohio—State Hy. Dpt., Columbus, imprv. 2.031 mi., Allen and Hancock Counties, Part 1, to Churchill Bros. Co., 1126 State St., Lima, **$57,452.** Bids 6/29. CD 6/24.

†**Ohio**—U. S. Eng., Dayton, paving, drainage, Contr. 1945-Eng-463, Greene Co., to A. W. Burns Constr. Co., 424 Woodland St., Columbus, under **$50,000.**

†**Ohio**—U. S. Eng., 522 U. S. Post Office & Courthouse, Cincinnati, paving, Contr. 203-Eng-2287, Hamilton Co., to W. L. Harper Co., 914 Main St., Cincinnati, under **$50,000.**

†**Oklahoma**—U. S. Eng., 416 Wright Bldg., Tulsa, constructing dust palliative treatment, Contr. 957-Eng-1975, Woodward Co., to H. Stafford, Lubbock, Tex., **$50,000-$100,000.** CD 6/15—ENR 6/17.

†**Oklahoma**—U. S. Eng., 231 W. Main St., Denison, Tex., grading, Contr. W-257-Eng-2347, Tillman Co., to D. Spencer, Carrollton, Tex., under **$50,000.**

†**Oregon**—U. S. Eng., 628 Pittock Blk., S.W. 10 Ave. and Washington St., Portland, repairing, surfacing roadways, Benton Co., to Parker-Schram Co., Couch Bldg., Portland, **$50,000-$100 000.** Awarded 7/6.

†**Oregon**—U. S. Eng., Pittock Blk., Portland, reconstructing existing roads and aprons, Contr. 698-Eng-3519, Multnomah Co., to Parker-Schram Co., Couch Bldg., Portland, under **$50,000.**

Ore., Astoria—G. Boyington, judge Clatsop Co., logging road Clatsop Forests, incl. cruising, mapping, fire line, truck trail, own forces. **$25,000.**

★**Pennsylvania**—State Hy. Dpt., Harrisburg, imprv. road, Philadelphia and Delaware

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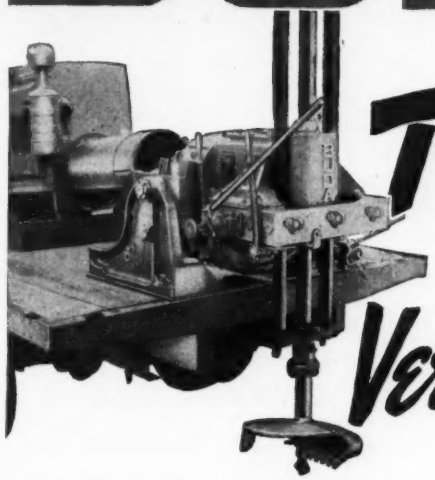

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STREETS and ROADS (Contracts Awarded, Cont'd.)

Counties, to Fred Berlanti & Son, Inc., 15 Oakind Ave., Harrison, N. Y., **$500,810.** Bids 5/28, awarded 7/9. CD 6/15—ENR 6/17, under LB.

Pennsylvania—State Hy Dpt., Harrisburg, concrete paving Philadelphia Co., to Seaboard Constr. Co., 1528 Walnut St., Phila., **$168,604.** Bids 5/19, awarded 7/9. CD 5/10—ENR 5/13.

†South Dakota—U. S. Eng., 1709 Jackson St., Omaha, Neb., bituminous road constr., Codington Co., to Northern Improvement Co., Fargo, N. D. Est. under **$50,000.**

†South Dakota—U. S. Eng., 1709 Jackson St., Omaha, Neb., bituminous road construction, Davison Co., to J. W. Craig Co., 1814 N.E. California St., Minneapolis, Minn. Est. under **$50,000.**

Tenn., Belle Meade (Nashville)—M. B. Howell, city mgr., imprv., maintaining 30 mi. streets, to Interstate Constr. Co., 3rd Natl. Bank Bldg., Nashville.

†Texas—U. S. Eng., San Antonio, roads, streets, parking areas, Contr. 2161-Eng-1394, Bexar Co., to J. D. Scarborough, 243 E. Rosewood St., San Antonio, **$50,000-$100,000.**

†Texas—U. S. Eng., Albuquerque, N. M., addnl. paving, Contr. 911-Eng-2040, to Uvalde Constr. Co., Santa Fe Bldg., **$50,000-$100,000;** and Contr. 911-Eng-2041, to E. Loyd, 3101 Stadium St., Fort Worth, **$50,000-$100,000,** both Reeves Co.

†Texas—U. S. Eng., Fort Sam Houston, roads, hardstanding area and fence, Bell Co., to Dean Ward, 446 E. Rosewood St., San Antonio, over **$50,000.**

Utah, Ogden—City Engineer, City and County Bldg., sidewalks, curbing, guttering Quincy Ave., to Wheelwright Constr. Co., 2434 Monroe Ave., **$40,798.** Bids 6/29.

Virginia—State Dpt. Hys., Richmond, imprv. 2.875 mi. Fairfax Co., to Eastern Building Supply Co., Inc., Exchange Bldg., Richmond, **$64,892;** Route 327, Proj. DA-NR 1277--M-10, Norfolk Co., to Luck Constr. Co., Box 7036, Richmond, **$131,650.** Bids 7/8. CD 6/29—ENR 7/1.

†Virginia—U. S. Eng., Fort Norfolk, Norfolk, roads, paving, Contr. 616-Eng-2557, Princess Anne Co., to Birsch Constr. Co., Box 26, 35 St. Sta., Norfolk, **$50,000-$100,000.**

†Washington—U. S. Eng., 800 3 Ave., Seattle, Zone 4, surfacing, Spokane Co., to Standard Asphalt Paving Co., Chronicle Bldg., Spokane, under **$50,000.**

†Washington—U. S. Eng., 800 3 Ave., Seattle, Zone 4, stabilization roads, King Co., to Northwest Precote Co., 7343 E. Marginal Way, Seattle, Zone 8, under **$50,000.**

Washington—B. Bantz, dir. Hys., Olympia, imprv. 3 mi. Pierce Co., 21.3 mi. Grays Harbor Co., 7 mi. Pierce Co., 7.26 mi. Thurston Co., 13.4 mi. Grays Harbor and Mason Counties, 21 mi. Grays Harbor and Pacific Counties, to J. F. Forbes, Olympia, **$66,203.** Bids 6/29. CD 6/22.

Ont., Ottawa—Concrete pavement base on Main St. from Clegg St. to point south of Bower Ave., to Standard Constr. Co., Ltd., 379 Catherine St., about **$52,000.** J. C. Askwith, City Hall, Ottawa, engr.

Ont., Oshawa—F. E. Hare, municipality clk., reconstructing pavements on several streets, day labor. **$25,000.** O. S. Miller, Town Hall, engr.

Quebec—Provincial Govt., Quebec City, graveling, paving 13.3 mi. road to Notre Dame du Conseil, St. Albert, to Modern Paving Ltd., 75 Richmond St., Montreal, **$87,000.** Bids 6/22.

EARTHWORK, WATERWAYS

PROPOSED WORK

Louisiana—Oyster Shell Products Corp., Morgan City, installing nine clusters from 3 to 5 piles each along a line 152 ft. long, Atchafalaya River (Berwick Bay), St. Mary Parish.

Nebraska—Central Nebr. PP Dist., Hastings, levelling farm land to be irregated, $250,000. Seeking government loan.

★**†Ore., Klamath Falls**—Bureau Reclamation, Interior Bldg., 19 and C Sts. N.W., Wash., D. C., constructing canals, 3 pump. plants, drains, checks and one 5 mi. main dike of modoc unit of Klamath Falls Basin Project. $610,000.

★**†Utah**—Bureau Reclamation, Dpt. Interior. Interior Bldg., 19 and C Sts. N.W., Wash., D. C., Scofield Dam, 420 ft. earth-fill structure, Carbon Co. providing 73,000 acre ft. storage. Total est. $640,000.

Wis., Phillips—City of Phillips and towns of Flambeau, Elk and Worcester, rebuilding Jobe's Dam. $18,000.

BIDS ASKED

Bids Asked July 28

Ia., Clinton—Bd. Supervs., Clinton Co., constructing 24½ stations of new outlet ditch cleaning, 582 stations open ditches also clearing, grubbing all on D. D. 7, near Calamus, 164,289 cu.yd. earth and 280 cu.yd. rock excav., etc. Over $25,000.

Bids Asked July 30

†Calif., Friant—U. S. Dpt. Interior, Bureau of Reclamation, Denver, Colo., furnishing, del. fixed-wheel gate for Madera canal outlet at Friant Dam, Friant Div., Central Valley Project., Spec. 1697-D.

Minn., Breckenridge—Wilkin Co., cleaning 16 mi. County Ditch 6, 90 acres clearing, 11,000 cu.yd. excav., dyke construction. $15,000. R. D. Setterlund, co. hy. engr.

LOW BIDDERS

Sask., Swift Current—Dom. Government, Ottawa, Ont., supply canal necessitating 1,320 lin. ft. culverts, 700,000 cu.yd. excav.; 20,000 FBM timber sheet piling etc., to M. B. Ramsay, 2 Saskachewan Life Bldg., Regina, **$149,605.** Prairie Farm Rd., 910 McCallum Hill Bldg., Regina, engr.

CONTRACTS AWARDED

†Arkansas—U. S. Eng., 300 Broadway, Little Rock, repairing levees, Crawford Co., to Morrisey Constr. Co., Vicksburg, Miss., **$100,000-$500,000.** CD 6/23—ENR 7/1.

†California—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, drainage facilities, No. 1359, Riverside Co., to Shipyard Constr. Co., 2609 Cherry Ave., Long Beach, under $50,000. Awarded 7/1.

†California—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, dredging, constructing railroad embankment, San Diego Co., to M. H. Golden, 3439 Noell St., San Diego, under **$50,000.** Awarded 6/28.

†Calif., Los Angeles—Pub. Bldgs. Admin., 18 and F Sts., N.W., Wash., 25, D. C., addnl. rip rap to raise embankment, Terminal Island, to Case Constr. Co., San Pedro, $17,572. FWA.

†Florida—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, excavation, embankment and backfill electric work, steel above-ground storage tanks, etc., Contr. 436-Eng-10255, Orange Co., to C. J. Keys, St. Petersburg, under $50,000.

†Maryland—U. S. Eng., Standard Oil Bldg., Baltimore, excavation, filling, grading, bituminous mixture for pavement surface course, bituminous material, etc., Contr. 174-Eng-2144, Baltimore Co., to Baltimore Asphalt Block & Tile Co., 1320 W. Monroe St., Baltimore, **$100,000-$500,000.**

†Maryland—U. S. Eng., Standard Oil Bldg., Baltimore, trench excav., shoring, backfilling, catch basins and vitr. clay pipe, Contr. 174-eng-2142, Baltimore Co., to Marocco Constr. Co., Inc., 231 S. Exeter St., Baltimore, under **$50,000.**

†New Jersey—U. S. Eng., 6 and Walnut Sts., Phila., Pa., repair and replacement of side slope lining of flood by-pass channel, Contr. 697-Eng-4722, Burlington Co., to Robt. E. Lamb & Son, Inc., 843 N. 19 St., Phila., Pa., under **$50,000.**

†Ohio—U. S. Eng., 700 Union Guardian Bldg., Detroit 31, Mich., excavating, grading, Contr. 272-Eng.-1309, Cuyahoga Co., to Lombardo Bros. Constr. Co., 1770 E. 11 St., Cleveland. Under **$50,000.**

†Oklahoma—U. S. Eng., 221 W. Main St., Denison, Tex., drainage, Contr. 257-Eng-2388, Tillman Co., to Vilbig Constr. Co., Paris and Bourbon Sts., Dallas, Tex. Under **$50,000.**

Tex., Galveston—State Hy. Dpt., Austin, ferry landing, facilities, etc., incl. hydraulic dredging, removing 198,000 cu.yd. materials, to Standard Dredging Co., Guaranty Bldg., Galveston, **$33,660.**

Ont., Owen—Sound-Dpt. P. Wks., Ottawa, dredging in harbour, to McNamara Constr. Co. Ltd., 12 Industrial St., Leaside, Toronto, **$23,484.**

UNCLASSIFIED

PROPOSED WORK

Conn., Bridgeport—HELICOPTER AIRPORT—Sikorsky Div. United Aircraft Corp., 400 Main St., East Hartford, helicopter airport, incl. hangar, facilities, South Ave. Albert Kahn, Associated Engrs. & Archts., Inc., 345 New Center Blvd., Detroit, Mich., engrs. and archts.

Conn., Middletown—PARK FACILITY DEVELOPMENTS—Bd. Park Comrs., City Hall, development park facilities, incl. playgrounds, picnic areas, baseball fields, football, etc. Over $25,000.

†Delaware—IMPROVEMENTS—U. S. Eng., 6 and Walnut Sts., Phila., Pa., bids soon, imprvs., Kent Co. $100,000.

†Georgia—IMPROVEMENTS—U. S. Eng., 512 Spring St. N.W., Atlanta, imprvs., A-14340, Cobb Co. $65,000.

†Louisiana—IMPROVEMENTS—U. S. Eng., 300 Bway., Little Rock, Ark., imprvs., bldgs., Rapides Parish, Ginnochio & Cromwell, Hall Bldg., Little Rock, Ark., archts.

La., Bayou Sale (mail Gardens City)—OIL WELL—Humble Oil & Refining Co., Humble Bldg., Houston, Tex., drilling, developing 10,200 ft. oil well.

La., Paradis—OIL WELL—Texas Co., Texas Bldg., Houston, drilling, developing 10,400 ft. oil well test.

La., Port Barre—OIL WELL—Gulf Refining Co., Gulf Bldg., Houston, drilling, developing new 6,900 ft. oil well test.

La., Port Barre—OIL WELL—Pan-American Oil Co., Texas City, Tex., drilling, developing 7,500 ft. oil well test.

La. Shreveport—GAS PIPELINE—United Gas Pipe Line Co., 1515 Fairfield Ave., 18 mi., 12¾ in. natural gas pipeline. Over $25,000.

†Minnesota—ELECTRIC LINES—Minnesota

UNCLASSIFIED (Proposed Work, Cont'd.)

Valley Electric Cooperative, Jordan, about 56 mi. rural electric distr. lines, Scott Co. and neighboring areas; rehabilitating 31 mi. existing line. $50,000. REA allot.

N. M., Roswell—OIL WELL—DeKalb Agricultural Assn., Inc., Lubbock, Tex., drilling, casing, developing 7,500 ft. rotary type oil well, 25 mi. west of here.

N. Y., Westfield—GAS DEVELOPMENT—Private interests c/o E. V. Billstone, 1391 Newland Ave., Jamestown, development potential Medina sand natural gas reserves, incl. drilling unspecified number 2,250 to 2,000 ft. wells, each requiring 1,900 to 2,000 ft., 6¼ in. pipe, etc., northern Chautauqua Co., near here. Over $40,000.

†O., Cleveland—WIND TUNNEL—National Advisory Com. Aeronautics, Cleveland Airport, plans completed brick, rein.-con. wind tunnel, office and shop bldg. $150,000.

O., Tiffin—PARK IMPROVEMENTS—City, G. R. Barrick, Serv. Dir., City Hall, making plans park imprvs., landscaping, seeding, sodding, plants, tennis courts, ball diamonds, shelter house, picnic grounds. $40,000. R. D. Raylor, 4614 Prospect Ave., Cleveland, landscape engr.

†Oklahoma—SWIMMING POOL—U. S. Eng., 416 Wright Bldg., Tulsa, swimming pool, Comanche Co. $15,000.

Okla., Autwine—OIL WELL—J. G. Cannon & Associates, Autwine, drilling, developing oil well test, near here.

Pa., Slippery Rock—GAS DEVELOPMENT—Manufacturers Light & Heat Co., Union Trust Bldg., Pittsburgh, extensive deep-sand natural gas development, incl. drilling unspecified number 7,000 ft. wells, connecting and gathering pipelines, etc., near here. Over $50,000.

†S. C., Camden—IMPROVEMENTS—Civil Aeronautics Admin., Chandler Bldg., Atlanta, Ga., imprvs. $150,000.

Texas — IMPROVEMENTS — Brownsville Municipal Airport, Brownsville, Tex., and Pan American Airways System, 135 E. 42 St., New York, N. Y., imprvs., bldg. $45,000.

Texas—OIL WELL—East Texas Salt Water Disposal Co., Tyler, drilling, developing deep well for salt water injection purposes, Upshur Co. $80,000.

Tex., Abilene—OIL WELL—B. & W. Oil Co., Abilene, drilling, developing new rotary type oil well.

Tex., Caldwell—OIL WELL—Ralph R. Ogden, Caldwell, drilling, developing new deep test oil well.

Tex., Carrizo Springs—OIL WELL—W. J. Walton & F. P. Galt, Carrizo Springs, drilling, developing 1,800 ft. oil well.

Tex., Corpus Christi—OIL WELL—J. E. Thomas & Associates, Corpus Christi, drilling, developing 6,500 ft. oil well test.

Tex., LaWard—OIL WELL—Hewitt & Dougherty, Edna, drilling, developing new oil well.

Tex., Moss Bluff—OIL WELL—Butcher Arthur No. 1, Olive Sherman, Wallisville, drilling, developing 6,000 ft. oil well.

Tex., Mt. Vernon—OIL WELL—Humble Oil & Refining Co., Humble Bldg., Houston, drilling, developing new oil well.

Tex., Oakville—OIL WELL—Superior Oil Corp., Natl. Bank of Tulsa Bldg., Tulsa, Okla., drilling, developing new deep test oil well.

Tex., Palestine — GAS DEVELOPMENT — Lone Star Gas Co., 1915 Wood St., Dallas, facilities for gathering low pressure gases from fields. Over $25,000.

Tex., Plains—OIL WELL—Texas Co., 720 San Jacinto St., Houston, drilling, developing deep test oil well.

Tex., Post (Townsite)—OIL WELL—E. M. Wahlenmaier, Post, drilling, developing new 4,200 ft. oil well test.

Tex., Raymondville—OIL WELL—Texas Co., 1700 San Jacinto St., Houston, drilling, developing new 10,000 ft. oil well.

Tex., Rio Grande—OIL WELL—Circle Oil Co., Pet. Bldg., Houston, drilling, developing new deep oil well.

Tex., Roma—OIL WELL—Fidelity Oil & Royalto Co., Rio Grande City, drilling, developing deep test oil well.

Tex., Three Rivers—OIL WELL—Argo Oil Corp., Three Rivers, drilling, developing new deep test oil well.

Tex., Stamford—OIL WELL—Great Lakes Carbon Corp., 22 E. 40 St., New York, N. Y., drilling, developing new 3,600 ft. oil well, 2 mi. southeast of here.

Tex., Yantis—OIL WELLS—Sun Oil Co., 1st Natl. Bank Bldg., Dallas, drilling, casing, developing three 6,000 ft. oil wells. Over $25,000.

Tex., Zapata—OIL WELL—Henne, Winch & Associates, Zapata, drilling, developing new oil well.

†Washington—FLOODLIGHTING, etc.—U. S. Eng., 800 3 Ave., Seattle, Zone 4, floodlighting, Neg. 642; blackout measures, Neg. 627 and 625; emergency cooling unit, Neg. 642; bldg. electrical distr. sys., Neg. 641; bldg. fire alarm and sprinkler sys., Neg. 640, King Co.

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UNCLASSIFIED (Proposed Work, Cont'd.)

★†**Wash., Seattle** — FACILITIES — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., expanding facilities at Naval Sta. $1,129,900.

★**West Virginia-Kansas**—GAS PIPELINE—Hope Natural Gas Co., United Carbon Bldg., Charleston, W. Va., 1,140 mi. 22 in. natural gas pipeline from Kanawha, W. Va., to point vicinity of Hugoton gas field in southwestern Kansas. $51,000,000.

†**Wis., Grantsburg**—IMPROVEMENTS—Burnett Co., Grantsburg, imprvs. $300,000. CAA. Foth & Boyd, Green Bay, engrs.

B. C., Half Moon Bay (Postal District Vancouver)—SUMMER RESORT, etc.—McDermid Miller & McDermid, Ltd., 525 Seymour St., Vancouver, summer resort and recreational facilities, $50,000.

N. S., Annapolis Royal—DRYDOCK—Dom. Govt., Ottawa, Ont., dry dock, $250,000. Dpt. Naval Affairs, Cartier Sq., Ottawa, Ont., archt. Dpt. M. S., Ottawa, Ont., engr.

★**N. S., Digby**—DRY-DOCK—Natl. Defense (Sea), Ottawa, Ont., large dry-dock. About $600,000-$800,000.

Que., Quebec City—PARK—Municipality, c/o F. X. Chouinard, city clk., Park Octave-Cremazie, on Cremazie and De Salaberry Sts. $25,000. E. Hamel, City Hall, engr.

Que., Sillery — WALL — Provincial Govt., Quebec City, rejected bids June 8, cement masonry wall along St. Louis Rd. Will readvertise. E. Gohier, Dpt. Roads, Quebec City, engr. CD 6/9—ENR 6/17.

BIDS ASKED

Bids Asked July 19

†**Mass., Hyannis** — IMPROVEMENTS—Civil Aeronautics Admin., Dpt. Commerce, P.O. Box 636, La Guardia Field, Jackson Heights, N. Y., imprvs. No. 14-200.

Bids Asked About July 22

†**Tex., Sweetwater**—IMPROVEMENTS—Dpt. of Commerce, c/o Civil Aeronautics Admin., Box 1689, Fort Worth, imprvs., incl. 1,000,000 cu. yd. excav., 300,000 sq. yd. paving, drainage, fencing, clearing, grubbing, etc. Plans deposit $20. CD 7/12.

Bids Asked About July 31

†**Tex., El Paso**—IMPROVEMENTS—Civil Aeronautics Admin., Dpt. of Commerce, P. O. Box 1689, Fort Worth, imprvs., incl. 250,000 cu. yd. excav., 1,000,000 sq. yd. caliche blanket, 250 acres clearing and grubbing, 383,000 sq. yd. paving, fencing, electric lighting, etc. Plans deposit $20. CD 7/8.

Bids Asked

New Jersey — SHIPYARD BLDGS. — East Coast Shipyards, foot 21 St., Bayonne, 1 story pipe fitters shop, also woodworking shop.

N. J., Jersey City—ELECTRICAL STANDARDS — Hudson Co., Courthouse, electrical standards and connections for lighting units, for roadways and retaining walls. F. Radigan, Courthouse, engr.

†**New York**—CONSTRUCTION—U. S. Eng., 120 Wall St., New York, miscellaneous construction, Nassau Co. $50,000.

LOW BIDDERS

†**Mo., Robertson**—IMPROVEMENTS—Civil Aeronautics Admin., City Hall, Kansas City, Mo., imprvs., grading, concrete paving etc., CAA 543-P-270, from Carl H. Peterson & Co., Box 575, Omaha, Neb., $185,605.

†**South Carolina**—SPRINKLER SYSTEM—U. S. Eng., 33 Custom House, Charleston, sprinkler sys. for bldgs., Charleston Co., from Century Sprinkler Corp., 305 Graham St., Richmond, Va.

†**Tex., Fort Worth**—IMPROVEMENTS—S. H. Bothwell, city mgr., imprvs., from Austin Road Co., 1813 Clarence St., Dallas, $83,544. CAA. CD 6/22—ENR 6/24.

CONTRACTS AWARDED

†**Alabama**—GASOLINE HYDRAULIC DISPLACEMENT SYSTEM—U. S. Eng., Grant St. west of Westwood St., Mobile, gasoline hydraulic displacement sys. revision, Contr. 569-eng-5190, Montgomery Co., to Gulf City Constr. Co., Mobile, under $50,000.

†**Alabama**—HARDSTANDINGS—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., hardstandings, Contr. 569-eng-5217, Dale Co., to Joe F. Walters, Troy, under $50,000.

†**Alabama**—IMPROVEMENTS—U. S. Eng., Grant St. west of Westwood St., Mobile, imprvs., Inv. 569-43-831, to Foster & Creighton Co., American National Bank Bldg., Nashville, Tenn. Est. $40,000.

★†**Alabama**—IMPROVEMENTS—U. S. Eng., Grant St. west of Westwood St., Mobile, imprvs., clearing, grading, drainage, paving, Jefferson Co., to Warren Bros. Roads Co., First National Bank Bldg., Birmingham. Est. $2,000,000. Bids 6/28.

†**Alabama**—IMPROVEMENTS—U. S. Eng., Grant St. west of Westwood St., Mobile, imprvs., bldgs., outside utilities, Inv. 569-43-821, Mobile Co., to Algernon Blair Co., First National Bank Bldg., Montgomery. Est. $25,000. Bids 6/26.

†**Alabama**—IMPROVEMENTS—U. S. Eng., Grant St. west of Westwood St., Mobile, imprvs., bldgs., etc., Inv. 569-43-834, Mobile Co., to Algernon Blair Co., First National Bank Bldg., Montgomery. Est. $75,000. Bids 6/28.

†**Alabama**—IMPROVEMENTS—U. S. Eng., Grant St. west of Westwood St., Mobile, imprvs., paving, Inv. 569-43-814, Montgomery Co., to Southeastern Constr. Co., Ozark. Est. $40,000. Bids 6/23.

†**Alabama**—PAVING, etc.—U. S. Eng., Grant St. west of Westwood St., Mobile, paving, drainage, sodding, Contr. 569-eng-5185, Tuscaloosa Co., to J. E. Milam Constr. Co., 8940 First Ave. S., Birmingham, $50,000-$100,000.

†**Alabama**—TARGET RANGE—U. S. Eng., Grant St. west of Westwood St., Mobile, target range, Contr. 569-eng-5218, Dale Co., to Joe F. Walters, Troy, under $50,000.

†**Arizona**—CONTROL TOWER, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, 14, Calif., control tower, crash truck station, No. 334F, Pima Co., to J. S. Sundt, 440 S. Park Ave., Tucson, under $50,000. Awarded 6/29.

†**Arizona**—IMPROVEMENTS—U. S. Eng., 751 S. Figueroa St., Los Angeles, 14, Calif., imprvs., No. 1267, Cochise Co., to Wonderly Constr. Co., 2694 Lima Ave., Long Beach, Calif., under $50,000. Awarded 6/30.

†**Arizona**—IMPROVEMENTS—U. S. Eng., 751 S. Figueroa St., Los Angeles, 14, Calif., imprvs., traffic control tower, No. 1351, Pima Co., to J. S. Sundt, 440 S. Park Ave., Tucson, under $50,000. Awarded 6/30.

†**Arizona**—IMPROVEMENTS—U. S. Eng., 751 S. Figueroa St., Los Angeles 14, Calif., imprvs., Yuma Co., to R. J. Daum, 6803 West Blvd., Inglewood, Calif., over $50,000. Awarded 6/29.

†**Arizona**—DUST CONTROL—U. S. Eng., 751 Figueroa St., Los Angeles, Zone 14, Calif., dust control by mulching, No. 225 F, Cochise Co., to Gilbert Pison, 315 Title And Trust Bldg., Phoenix, under $50,000.

†**Arizona**—HANGAR DOORS—U. S. Eng., 751 S. Figueroa St., Los Angeles, 14, Calif, hangar doors, Contr. 509-Eng-5138, Mohave Co., to Trucson Steel Co., 5480 E. Slausen Ave., Los Angeles, under $50,000.

†**Arkansas**—CLEARING, etc.—U. S. Eng., 300 Bway., Little Rock, clearing trees and obstructions from approach zones, Contr. 777-Eng-1741, Arkansas and Monroe Counties, to Gilliot Co., Inc., Monett, Mo., under $50,000.

†**Arkansas**—IMPROVEMENTS—U. S. Eng., 300 Bway., Little Rock, imprvs., bldgs., Mississippi Co., to M. O. Branton, 402 E. Markham St., Little Rock, under $50,000.

†**Arkansas**—IMPROVEMENTS—U. S. Eng., 300 Bway., Little Rock, imprvs., repairing roads, Mississippi Co., to D. F. Jones Constr. Co., Insurance Bldg., Little Rock. Est. $50,000.

†**Arkansas**—MOTOR PARK FACILITIES—U. S. Eng., 300 Bway., Little Rock, motor park facilities, Pulaski Co., to Ditmars-Dickmann Constr. Co., 804 Barnes Bldg., Muskogee, Okla. Est. $50,000.

†**California**—BALLOON TRACK, etc.—U. S. Eng., 74 New Montgomery St., San Francisco, balloon track, loading spurs, Central California, to A. D. Schader, 144 Spear St., San Francisco. Awarded 7/2.

†**California**—ELECTRIC WIRING ALTERATIONS—U. S. Eng., 74 New Montgomery St., San Francisco, electric wiring alterations, San Francisco Co., to Tattenham Electric Mfg. Co., 20 Manor Dr., San Francisco. Awarded 7/2. CD 6/30—ENR 7/8.

†**California**—FENCE and RAMP—U. S. Eng., 74 New Montgomery St., San Francisco, fence, ramp, San Francisco Co., to E. J. Freethy, 1432 Kearny St., El Cerrito. Awarded 7/2.

†**California**—IMPROVEMENTS—U. S. Eng., 74 New Montgomery St., San Francisco, imprvs., Central California, to Howson Bros., Las Animas Ave., Gilroy. Awarded 7/2.

†**California**—IMPROVEMENTS—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, imprvs., No. 289C, Inyo Co., to Galen B. Finch, 1055½ F St., San Bernardino, under $50,000.

†**California**—IMPROVEMENTS—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, imprvs., San Diego Co., to Earl W. Gray, 1369 LaPalma St., Pacific Beach, under $50,000. Awarded 6/28.

†**California**—IMPROVEMENTS—U. S. Eng., 74 New Montgomery St., San Francisco, imprvs., piling, concrete work, San Francisco Co., to MacDonald & Kahn, Inc., 200 Financial Center Bldg., San Francisco. Awarded 7/2.

†**California** — LIGHTING SYSTEM — U. S. Eng., 74 New Montgomery St., San Francisco, night lighting sys., Central California, to Collins Electrical Co., 708 E. Market St., Stockton. Awarded 7/2.

†**California** — LIGHTING SYSTEM — U. S. Eng., 74 New Montgomery St., San Francisco, night lighting sys., Northern California, to A. Brizard, Inc., Arcata. Awarded 7/2.

†**California** — OBSTRUCTION LIGHTING — U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, obstruction lighting, No. 1362, Riverside Co., to Varcott Co., 5024 W. Washington Blvd., Los Angeles, under $50,000.

†**California**—RAILROAD SPUR, etc.—U. S. Eng., 74 New Montgomery St., San Francisco, railroad spur, platform and ramps, Contr. 868-eng-5462, Alameda Co., to F. Ziebarth, South San Francisco, under $50,000.

†**California** — RELOCATING RAILROAD — U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, relocating railroad, San Diego Co., to T. V. Kvale, Box 156, Route 2, Ojai, un-

UNCLASSIFIED (Contracts Awarded, Cont'd.)

der **$50,000.** Awarded 6/28.

†**California**—TRAINING AIDS—U. S. Eng., 74 New Montgomery St., San Francisco, training aids, Central California, to Coast Counties Constr. Co., 150 Towt St., Salinas. Awarded 7/2.

†**California**—FIRE PREVENTION SYSTEM—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, fire prevention sys., Contr. 509-Eng-5168, Los Angeles Co., to Ben M. Sciewe, 361 N. Fuller Ave., Los Angeles, under **$50,000.**

†**California**—MAT EXTENSION, etc.—U. S. Eng., 1209 - 8 St., Sacramento, Zone 8, mat exten., roads, Contr. 1105-Eng-5122, Kern Co., to J. E. Haddock, Ltd., Third & Huntington Dr. Arc., Pasadena, **$50,000-$100,000.**

†**California**—IMPROVEMENTS—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, imprvs., Spec. 1377, Kern Co., to O'Neal & Hedberg, 852 S. Robertson Blvd., Los Angeles, over **$100,000.**

†**California**—UTILITIES YARD, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, utility yard, temporary frame bldg., Contr. 509-Eng-5135, Los Angeles Co., to Paul B. Treat, 1745 S. Hayworth St., Los Angeles, under **$50,000.**

†**Connecticut** — FUELING SYSTEM — U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., fueling sys., Contr. 699-Eng-2410, New London Co., to Carlo Bianchi & Co., Inc., Framingham, Mass., under **$50,000.**

†**Connecticut** — IMPROVEMENTS — U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., imprvs., Fairfield Co., to Leverty & Hurley, Bostwick Ave., Bridgeport. Est. under **$50,000.**

†**Connecticut**—SEEDING, etc.—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., seeding, grading, clearing, Contr. 699-Eng-2422, Hartford Co., to The Lane Constr. Co., 35 Colony St., Meriden, **$100,000-$500,000.**

†**Connecticut**—RUNWAY—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., runway exten., Contr. 699-eng-2430, New London Co., to Carlo Bianchi & Co., Inc., Framingham, Mass., **$50,000-$100,000.**

†**Delaware**—LIGHTING—U. S. Eng., 6 and Walnut Sts., Phila., Pa., installing night lighting, Contr. 697-eng-4792, Kent Co., to Electric Constr. Co., 5824 Brush Rd., Phila., Pa., under **$50,000.**

†**Florida**—AIR-CONDITIONING SYSTEM—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, installing air-conditioning sys., Neg-Jax-43-1196, Duval Co., to Florida Weather Makers, Inc., 805 Hogan St., Jacksonville, under **$50,000.** Awarded 6/29.

†**Florida**—AIR-CONDITIONING SYSTEM—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, air-conditioning sys., Neg-WPB-43-40, Palm Beach Co., to John H. Couse, 308 Fern St., West Palm Beach, under **$50,000.** Awarded 6/28.

†**Florida**—CLEARING—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, clearing sight obstruction, Neg-Jax-43-1079, Sarasota Co., to Cone & Manley Constr. Co., Caesar St. Cumberland Rd., Tampa, under **$50,000.** Awarded 6/26.

†**Florida**—CLEARING, GRUBBING, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, clearing, grubbing, paving, excavation Lee Co., to Cone & Manley, Caesar St. Cumberland Rd., Tampa, **$100,000-$500,000.** Awarded 7/3.

†**Florida**—CLEARING, GRUBBING, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, clearing, grubbing, excavation, drainage facilities, etc., Contr. 436-eng-10263, Palm Beach Co., to Cleary Bros. Constr. Co., West Palm Beach, **$100,000-$500,000.**

†**Florida**—DOCK—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, dock exten., Neg-Jax-43-1091, Orange Co., to Benton & Co., St. Petersburg, under **$50,000.** Awarded 6/23.

†**Florida**—FACILITIES—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, converting existing facilities, Neg-Jax-43-1204, Palm Beach Co., to P. C. Lissenden Co., West Palm Beach, under **$50,000.**

†**Florida**—FENCES—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, fences, Neg-Jax-43-1114, Palm Beach Co., to J. S. Willson, Worth Ave., Palm Beach, under **$50,000.** Awarded 6/26.

†**Florida**—FENCING—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, fencing, Neg-Jax-43-1120, Dade Co., to Delgarrd & Preston Builders, Inc., Coral Gables, under **$50,000.** Awarded 6/28.

†**Florida**—FIRE ALARM SYSTEM—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, fire alarm sys., Neg-Jax-43-1167, Duval Co., to American District Telegraph Co., Western Union Bldg., Jacksonville, under **$50,000.** Awarded 6/28.

†**Florida**—GRADING, GRASSING — U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, grading, grassing, Neg-Jax-43-1161, Hillsborough Co., to James H. Craggs Constr. Co., Ocala, under **$50,000.** Awarded 6/28.

†**Florida**—GRASSING—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, grassing, Neg-Jax-43-1183, Dixie Co., to B. M. Richardson, Danville, Ga., under **$50,000.** Awarded 6/27.

†**Florida**—GRASSING—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, grassing, Neg-Jax-43-1119, Hillsborough Co., to Florida Nursery & Landscape Co., Leesburg, under **$500,000.** Awarded 6/23.

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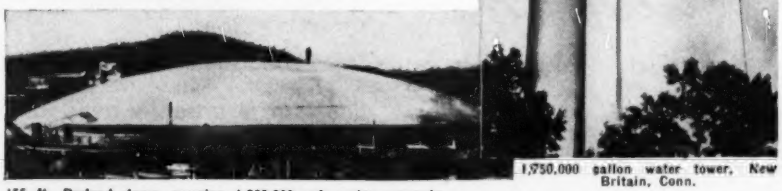

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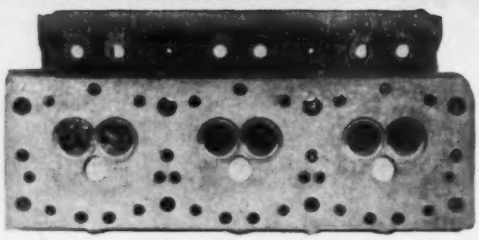

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UNCLASSIFIED (Contracts Awarded, Cont'd.)

†**Florida**—GRASSING—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, grassing, Neg-Jax-43-1067, Palm Beach Co., to Mike Blank Nursery, Delray Beach, under **$50,000.** Awarded 6/30.

†**Florida**—GRASSING—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, grassing, Neg-Jax-43-1116, Polk Co., to Florida Nursery & Landscape Co., Leesburg, under **$50,000.** Awarded 6/26.

†**Florida**—HARDSTANDS—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, hardstands, Neg-Jax-43-1129, Hernando Co., to W. H. Armston Co., Inc., 357 Scotland Rd., Dunedin, under **$50,000.** Awarded 6/28.

†**Florida**—HARDSTANDS—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, hardstands, Neg-Jax-43-1163, Levy Co., to Rose & Horne, Ocala, under **$50,000.** Awarded 6/26.

†**Florida**—IMPROVEMENTS—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, imprvs., transition firing course ranges, Contr. 436-eng-10279, Bradford Co., to B. B. McCormick & Sons, Inc., Jacksonville, under **$50,000.**

†**Florida** — IMPROVEMENTS — U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, imprvs., Contr. 436-Eng-10075, Dade Co., to Brady Roofing Tiles Mfg. Co., Miami, under **$50,000.**

†**Florida** — IMPROVEMENTS — U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, imprvs., parking aprons, Neg-Jax-43-1171, Highlands Co., to B. B. McCormick & Sons, Graham Bldg., Jacksonville, under **$500,000.** Awarded 6/30.

†**Florida** — IMPROVEMENTS — U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, imprvs., apron, Neg-Jax-43-1174, Osceola Co., to William J. Knauer, Orlando, under **$50,000.** Awarded 6/25.

†**Florida**—RANGE—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, range, Neg-Jax-43-1093, Lee Co., to Moody Bros. Plumbing & Heating Co., Fort Meyers, under **$50,000.** Awarded 6/24.

†**Florida**—SPRIGGING, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, sprigging, seeding, liming, Contr. 436-eng-10227, Duval Co., to J. O. Holmes, N. Nebraska Ave. and S. Apex St., Tampa, under **$50,000.**

†**Florida**—SPRIGGING and SEEDING—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, sprigging, seeding, Dixie Co., to Charles K. McCaskill, Jr., Perry, under **$50,000.** Awarded 7/1.

†**Florida** — SPRIGGING, WEEDING — U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, sprigging, weeding, Neg-Jax-43-1011, Palm Beach Co., to Boynton Landscape Co., Palm Beach, under **$500,000.** Awarded 6/24.

†**Florida**—STEAM DISTRIBUTION SYSTEM, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, steam distr. sys., boiler house equip. installation, Neg-Jax-43-1144, Duval Co., to H. G. DuPree, 1931 Hendricks Ave., Jacksonville, under **$500,000.** Awarded 6/28.

†**Florida**—STEAM LINE—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, installing steam line, Neg-DF-43-53, Hillsborough Co., to R. T. Joughin Co., 1502 Franklin St., Tampa, under **$50,000.** Awarded 6/28.

†**Florida**—TARGET RANGE—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, target range, Neg-Jax-43-1127, Dade Co., to W. T. Price Dredging Corp., 3200 S.W. 27 Ave., Miami, under **$50,000.** Awarded 6/29.

†**Florida**—TAXIWAYS, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, imprvs., taxiways, hardstands, Neg-Jax-43-1185, Hillsborough Co., to James H. Craggs Constr. Co., Ocala, under **$500,000.** Awarded 6/30.

†**Florida**—VENTILATING & MECHANICAL COOLING SYSTEM—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, ventilating and mechanical cooling sys., Neg-Jax-43-1190, Orange Co., to H. A. Dougherty & Co., 210 N. Orange St., Orlando, under **$50,000.** Awarded 6/30.

†**Florida**—APRON—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, apron, Neg-Jax-43-109, Dade Co., to W. T. Price Dredging Corp., 3200 S.W. 27 St., Miami, under **$50,000.** Awarded 6/30.

†**Florida**—FACILITIES—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, vehicle main facilities, Neg-Jax-43-1188, Lee Co., to R. E. Clarson, Inc., 101 - 5 St., S., St. Petersburg, under **$50,000.** Awarded 6/30.

†**Florida**—FIRE ALARM SYSTEM—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, fire alarm sys., Neg-Jax-43-1041, Monroe Co., to American District Telegraph Co., Western Union Bldg., Miami, under **$50,000.** Awarded 6/30.

†**Florida**—HANGARS—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, hangars, Neg-M.I.-43-42, Dade Co., to Frank J. Rooney, 600 N.E. 116 St., Miami, under **$50,000.** Awarded 6/30.

†**Florida**—IMPROVEMENTS—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, imprvs., Neg-Jax-43-1042-R, Orange Co., to J. E. Ewell, Lakeland, under **$50,000.** Awarded 6/29.

†**Florida**—RIFLE RANGE—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, rifle range, Neg-Jax-43-1195-A, Orange Co., to Clyde J. Keys, Federal Bldg., St. Petersburg, under **$50,000.** Awarded 6/29.

†**Florida**—TAXIWAY—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, taxiway, Neg-Jax-43-1207, Taylor Co., to Marion Contg.

UNCLASSIFIED (Contracts Awarded Cont'd)

Co., Ocala, under **$500,000.** Awarded 6/30.

†**Florida**—SIGNAL STATION—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, signal 2, signal station, Neg-K.W.F. 43-3, Monroe Co., to Watt & Sinclair, Inc., 207 Royal Palm Way, Palm Beach, under **$50,000.** Awarded 6/30.

†**Florida** — SPRINKLER SYSTEM — U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, sprinkler system, Neg-jax-43-1133, Monroe Co., to Moore Pipe & Sprinkler Co., 1130 W. State St., Jacksonville, under **$50,000.** Awarded 6/30.

†**Florida**—WALL AND TIMBER PILING —U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, concrete wall, timber piling, Neg-W.P.B.-43-42, St. Lucie Co., to Cleary Bros. Constr. Co., Georgia Ave., West Palm Beach, under **$500,000.** Awarded 6/30.

†**Georgia**—CLEARING—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., clearing felled timber, Contr. 569-Eng-5215, Muscogee Co., to Williams Constr. Co., Columbus, under **$50,000.**

†**Georgia**—CLEARING, GRUBBING, etc.—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, clearing, grubbing, excavation, fences, drainage facilities, etc., Contr. 436-eng-10236, Lowndes Co., to Coffee Constr. Co., Eastman, **$50,000-$100,000.**

†**Georgia**—FIRE ALARM SYSTEM—U. S. Eng., Post Office Bldg., Savannah, installing fire alarm sys., Contr. 819-eng-1587, Richmond Co., to American District Telegraph Co., Western Union Bldg., Atlanta, under **$50,000.**

★†**Ga., Rome** — IMPROVEMENTS — Civil Aeronautics Admin., Municipal Airport, Atlanta, imprvs., Contr. 2, to R. B. Tyler, Monroe, N. C., **$568,912;** Contr. 1, to W. L. Florence, Powder Springs, **$584,931.**

†**Idaho**—ELECTRICAL WORK—U. S. Eng., Pittock Blk., Portland, Ore., electrical installation, Minidoka Co., to City Electric Co., Boise, under **$50,000.**

†**Idaho**—APRON—U. S. Eng., Pittock Blk., Portland, Ore., reconstructing apron, Contr. 698-eng-3525, Ada Co., to J. A. Terteling & Sons, Robert Noble Bldg., Boise, **$100,000-$500,000.**

†**Idaho**—RUNWAYS, ETC.—U. S. Eng., Pittock Blk., Portland, Ore., reconstructing runways and taxiways and constructing clear zone, Contr. 698-eng-3516, Ada Co., to J. A. Terteling & Sons, Robert Noble Bldg., Boise, **$100,000-$500,000.**

†**Illinois**—STEAM DISTRIBUTION—U. S. Eng., 520 Merchandise Mart, Chicago, steam distr. sys. and removing smoke stacks, Contr. 1088-eng-3110, Champaign Co., to Constructor Co., 2059 St. Anthony Ave, St. Paul, Minn., **$50,000-$100,000.**

†**Indiana**—FACILITIES—U. S. Eng., 612 Federal Bldg., Louisville, Ky., addnl. facilities, Contr. 559-Eng-7005, Vanderburgh Co., to Pearson Constr. Co., Inc., Benton Harbor, Mich., **$50,000-$100,000.**

†**Iowa**—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, Neb., imprvs., bldgs., Woodbury Co., to H. S. Holtze Constr. Co., 2121 E. 4 St., Sioux City, Ia. Est. under **$50,000.**

†**Iowa**—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, Neb., imprvs., Woodbury Co., to Lenci-Lenci, Englund & Stavn, Montgomery, Minn., under **$50,000.**

†**Kansas**—GASOLINE STORAGE SYSTEM —U. S. Eng., 10 E. 17 St., Kansas City, Mo., gasoline storage sys. addn., Dickinson Co., to Industrial Htg. & Plbg. Co., 103 S. 4 St., St. Joseph, Mo. Est. under **$50,000.**

†**Kansas**—IMPROVEMENTS—U. S. Eng., 10 E. 17 St., Kansas City, Mo., imprvs., Dickinson Co., to Rhodes Const. Co., Newton. Est. under **$50,000.**

†**Kansas**—IMPROVEMENTS—U. S. Eng., 10 E. 17 St., Kansas City, Mo., imprvs., Ellis Co., to Rhodes Constr. Co., Newton. Est. under **$50,000.**

†**Kansas** SWIMMING POOL—U. S. Eng., 10 E. 17 St., Kansas City, Mo., swimming pool, Shawnee Co., to Charles Bennett Constr. Co., 9 and Washburn Sts., Topeka. Est. under **$50,000.**

†**Kentucky**—TARGET RANGES, ETC.—U. S. Eng., 306 U. S. Courthouse, Nashville, Tenn., target ranges, temporary frame bldgs., Contr. 612-eng-949, Montgomery Co., to Dykes, Powers & Gerhardt Const. Co., Clarksville, Tenn., under **$50,000.**

†**Louisiana**—CONSTRUCTION—U. S. Eng., 25 St. and Avenue F, Galveston, Tex., construction, Jefferson Parish, to Boh Brothers Constr. Co., 2400 Cypress St., New Orleans, under **$50,000.**

†**Louisiana**—ELECTRIC ALARM SYSTEM —U. S. Eng., 25 St. and Avenue F, Galveston, Tex., electric alarm sys., inside and out, Orleans Parish, to American District Telegraph Co., 155 6 Ave., New York, N. Y., and Interurban Bldg., Dallas, Tex., under **$50,000.**

†**Louisiana**—IMPROVEMENTS—U. S. Eng., 300 Bway., Little Rock, Ark., imprvs., runway, taxiway, grading, drainage and accessory work, Contr. 777-Eng-1745, Ouachita Parish, to T. L. James & Co., Inc., Ruston. **$100,000-$500,000.**

★†**Louisiana** — IMPROVEMENTTS — U. S. Eng., 300 Bway., Little Rock, Ark., imprvs., bldgs., to Massman Constr. Co., 737 New York Life Bldg., Kansas City, Mo., under **$1,000,000;**

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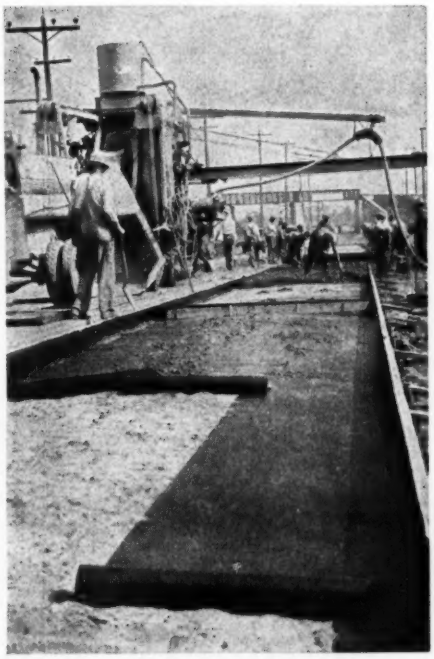

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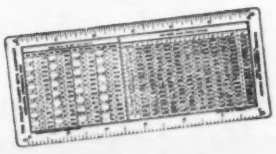

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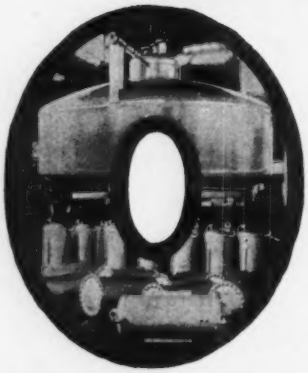

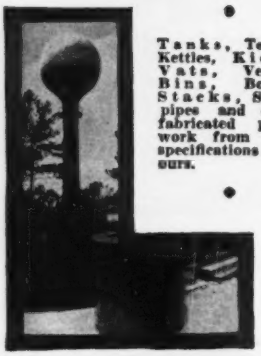

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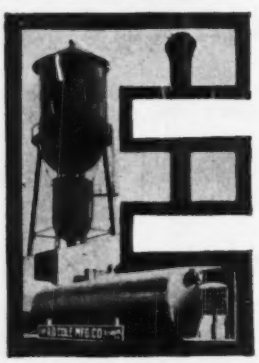

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addnl. bldgs., to Gravier & Harper, Alexandria, under **$500,000**, both, Rapides Parish. Awarded 6/30.

†Louisiana—IMPROVEMENTS—U. S. Eng., 300 Bway., Little Rock, Ark., imprvs. bldg., Rapides Parish, to Barnett-Brezner, Alexandria, **$50,000**.

†Maine—GRADING, TURFING—U. S. Eng., 31 St. James Ave., Boston, Mass., grading, turfing, Aroostook Co., to Bridge Constr. Corp., 335 Water St., Portland. Est. **$50,000-$100,000**.

†Maine—UTILITIES—U. S. Eng., 31 St. James Ave., Boston, Mass., utilities, Aroostook Co., to John Lucas Co., 175 Sheridan St., Portland. Est. under **$50,000**.

†Maine—WHARF, etc.—U. S. Eng., 31 St. James Ave., Boston, Mass., timber wharf, road, Contr. 175-Eng-2588, York Co., to E. C. Snodgrass, 161 S. Front St., South Portland, **$50,000-$100,000**.

†Massachusetts—GRADING—U. S. Eng., 31 St. James Ave., Boston, grading, No. 176-43-NEG-393, Middlesex Co., to P. Salvicou, 55 Pond St., Waltham. Est. **$100,000-$500,000**. CD 6/30—ENR 7/8.

†Massachusetts — IMPROVEMENTS — U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., imprvs., Bristol Co., to Henley Lundgren Co., 524 River St., Mattapan. Est. under **$50,000**.

†Massachusetts—LIGHTING SYSTEM—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., lighting sys., No. 43-271, Bristol Co., to New England Power Service Co., 441 Stuart St., Boston. Est. under **$50,000**. Bids 6/23. CD 6/24.

†Massachusetts—CONCRETE WORK—U. S. Eng., 31 St. James Ave., Boston, concrete work, bldg., etc., Middlesex Co., to Richard White Sons, Inc., 67 Cherry Pl., Newton. Est. under **$50,000**.

†Massachusetts—FENCING—U. S. Eng., 31 St. James Ave., Boston, fencing, Middlesex Co., to Yeomans-O'Connell Co., 353 Washington St., Brighton. Est. under **$50,000**.

†Massachusetts—STABILIZED COLLARS, etc.—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., stabilized collars for hardstandings, Contr. 699-eng-2392, Hampden Co., to Lane Constr. Corp., 37 Colony St., Meriden, Conn., under **$50,000**.

†Michigan—TRANSFER PITS, etc.—U. S. Eng., 700 Union Guardian Bldg., Detroit 31, reconstructing transfer pits and lumber storage, Contr. 272-Eng-1310, Macomb Co., to Paul M. Sterling, Room 2030, Book Cadillac Hotel, Detroit, under **$50,000**.

†Minnesota—IMPROVEMENTS—U. E. Eng., 1709 Jackson St., Omaha, Neb., imprvs., storm sewers, electric distr. lines, installing outside utilities, Hennepen Co., to Fielding & Shepley, 1258 Bohn Ave., St. Paul. Est. under **$100,000**. Bids 6/26.

†Minnesota—IMPROVEMENTS—U. E. Eng., 1709 Jackson St., Omaha, Neb., imprvs., bldgs., etc., Hennepin Co., to Madsen Constr. Co., 1790 Lyndale Ave. S., Minneapolis. Est. under **$500,000**. Bids 6/25.

†Minnesota—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, Neb., imprvs., Morrison Co., to P. J. Pappenfus, St. Cloud. Est. under **$50,000**.

†Mississippi—GRADING, etc.—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., grading and muck stabilization, Contr. W-569-Eng-5203, Harrison Co., to R. H. Taylor & J. L. Wheless, Hattiesburg, **$100,000-$500,000**. CD 6/30—ENR 7/8.

†Mississippi — RAILROAD SPUR — U. S. Eng., Grant St., west of Westwood St., Mobile, Ala., addnl. railroad spur for storage yard, Inv. 569-43-827, Hinds Co., to J. W. Gibson, Brewton, Ala., under **$50,000**. Bids 6/25, awarded 7/1.

★ **†Montana** — IMPROVEMENTS — U. S. Eng., 800 3 Ave., Seattle 4, Wash., imprvs., Cascade Co., to S. Birch & Sons Constr. Co., and J. L. McLaughlin, Ford Bldg., Great Falls, over **$3,000,000**. CD 6/2—ENR 6/10.

†Montana—CONSTRUCTION—U. S. Eng., 800 3 Ave., Seattle 4, Wash., construction, Fergus Co., to Dudley-Andersoh Co., Great Falls, under **$50,000**.

†Montana—FACILITIES—U. S. Eng., 800 3 Ave., Seattle 4, Wash., exten. facilities, Cascade Co., to Utility Builders, Great Falls, under **$50,000**.

†Nebraska — GASOLINE STORAGE SYSTEM—U. S. Eng., 1709 Jackson St., Omaha, gasoline storage sys., Redwillow Co., to Aqua Systems, Inc., 385 Gerard Ave., New York, N. Y. Est. under **$50,000**.

†Nebraska — GASOLINE STORAGE SYSTEM—U. S. Eng., 1709 Jackson St., Omaha, gasoline storage sys., Scottsbluff Co., to Inland Constr. Co., 3867 Leavenworth St., Omaha. Est. under **$50,000**.

†Nebraska—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, imprvs., bldg. alterations, Box Butte Co., to Olson Bros., 410 S. 7 St., Lincoln. Est. under **$50,000**.

†Nebraska—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, imprvs., coal storage area, Clay Co., to Lowe Const. Co., 417 1 Ave. S.E., Cedar Rapids, Ia., under **$50,000**.

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†**Nebraska**—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, imprvs., coal storage area, Fillmore Co., to Lowe Constr. Co., 417 1 Ave. S.E., Cedar Rapids, Ia., under **$50,000.**

†**Nebraska**—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, imprvs., coal storage area, Hall Co., to Platte Valley Constr. Co., Grand Island, under **$50,000.**

†**Nebraska**—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, imprvs., Hall Co., to Roush Constr. Co., Concordia, Kan. Est. under **$50,000.**

†**Nebraska**—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, imprvs., grading, Polk Co., to Arthur H. Neumann & Bros. Inc., 514 Hubbell Bldg., Des Moines, Ia. Est. under **$50,000.**

†**Nebraska**—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, imprvs., coal storage area, Scottsbluff Co., to Inland Constr. Co., 3867 Leavenworth St., Omaha. Est. under **$50,000.**

†**Nebraska**—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, imprvs., coal storage area, Thayer Co., to Lowe Const. Co., 417 1 Ave., S.E. Cedar Rapids, Ia.

†**Nebraska**—STORAGE SYSTEM—U. S. Eng., 1709 Jackson St., Omaha, gasoline storage sys., Brown Co., to McLain-Wolff Co., Yankton, S. D. Est. under **$50,000.**

†**Nevada**—ELECTRIC SYSTEM—U. S. Eng., 1209 8 St., Sacramento, 8, Calif., electric sys., Spec. 611, Nye Co., to H. O. Bauerle, 220 E. Valley Blvd., El Monte, under **$50,000.**

†**Nevada** — IMPROVEMENTS — U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., imprvs., drilling Well 4, Solic. 1371, Clark Co., to Roscoe Moss Co., 4360 Worth St., Los Angeles, Calif., under **$50,000.** Awarded 6/28.

†**Nevada**—FUELING SYSTEM, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles 14, Calif., fueling sys., addnl. stg. facilities, Contr. 509-Eng-5153, Clark Co., to L. A. Lefevre, 4916 Ben Ave., North Hollywood, Calif., under **$50,000.**

†**Nevada**—HANGAR DOORS—U. S. Eng., 751 S. Figueroa St., Los Angeles 14, Calif., hangar doors, Contr. 509-Eng-5137, Clark Co., to Truscon Steel Co., 5480 E. Slauson Ave., Los Angeles, Calif., under **$50,000.**

†**New Hampshire**—FENCING—U. S. Eng., 31 St. James Ave., Boston, Mass., fencing, Rockingham Co., to Landers & Griffin, Inc., High St., Portsmouth. Est. under **$50,000.**

†**New Hampshire**—GRADING, etc.—U. S. Eng., 31 St. James Ave., Boston, Mass., grading, seeding, No. 175-43-NEG-391, Hillsboro Co., to Central Constr. Co., Beacon Ave., Lawrence, Mass. Est. under **$50,000.** CD 6/30—ENR 7/8.

†**New Jersey**—CONSTRUCTION—U. S. Eng., 120 Wall St., New York 5, N. Y., miscellaneous construction, Contr. 1097-Eng-4139, Hudson Co., to B. J. Lucarelli & Co., Inc., 22 Orchard St., Jersey City, under **$50,000.**

†**New Mexico** — IMPROVEMENTS — U. S. Eng., Albuquerque, addnl. imprvs., grading, paving, Curry Co., to Martin & Cowart, Albuquerque, under **$100,000.** Awarded 7/7.

†**New Mexico**—ELECTRICAL FACILITIES—U. S. Eng., Albuquerque, electrical facilities, Curry Co., to H. M. Nicholson, 939 Bway., Los Angeles, Calif., under **$50,000.** Awarded 7/3.

†**New Mexico**—IMPROVEMENTS—U. S. Eng., Albuquerque, imprvs., addln. taxiways, parking apron, Contr. 911-eng-2045, De Baca Co., to Brown Bros., Albuquerque, **$100,000-$500,000.**

†**New Mexico** — IMPROVEMENTS — U. S. Eng., Albuquerque, imprvs., addnl. taxiways, parking apron, Contr. 911-eng-2044, DeBaca Co., to Skousen Bros., Albuquerque, **$100,000-$500,000.**

†**New York**—CLEARING, etc.—U. S. Eng., 120 Wall St., New York, Zone 5, clearing, grading, drainage, Contr. 1097-eng-1878, Richmond Co., to M. L. Klostergard, 4 Codington Ave., Dongan Hills, Staten Island, under **$50,000.**

†**New York**—HANGAR DOORS—U. S. Eng., Chimes Bldg., Syracuse, hangar doors, Contr. 321-Eng-935, Oneida Co., to Dawson Bros. Constr. Co., Inc., Union Bldg., Syracuse, under **$50,000.**

†**New York**—SEEDING—U. S. Eng., Chimes Bldg., Syracuse, seeding, Contr. 321-Eng-919, Onondaga Co., to Agricultural Co., Fayetteville, **$100,000-$500,000.**

†**New York**—TARGET BUTT—U. S. Eng., Chimes Bldg., Syracuse, target butt, Contr. 321-Eng-938, Oneida Co., to Elmhurst Contracting Co., 53-09 97 Pl., Corona, under **$50,000.** CD 7/2.

†**New York**—TRAINING AIDS—U. S. Eng., Chimes Bldg., Syracuse, training aids, Contr. 321-Eng-941, Jefferson Co., to Deline Constr. Co., Watertown, under **$50,000.**

†**New York**—TROOP UNLOADING FACILITIES—U. S. Eng., 120 Wall St., New York, Zone 5, addnl. troop unloading facilities, Contr. 1097-Eng-4111, Rockland Co., to B. Perini & Sons, Inc., Montwait Ave., Framingham Mass., **$100,000-$500,000.**

†**North Carolina**—IMPROVEMENTS—U. S. Eng., Florence, S. C., imprvs., Robeson and

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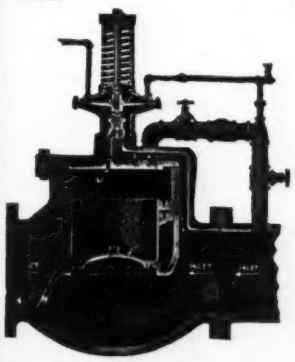

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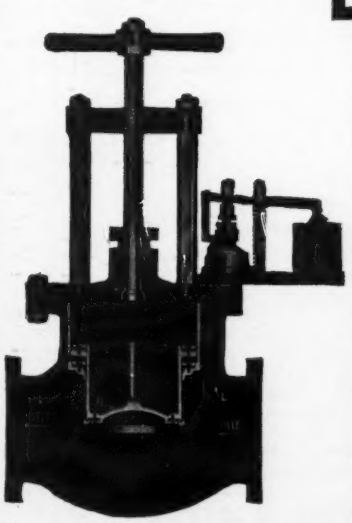
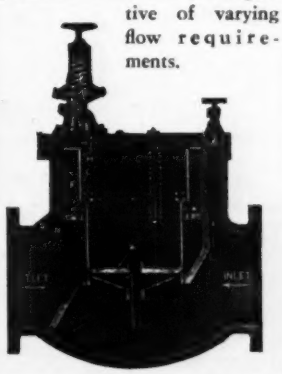


Water Pressure Reducing valve assures uniform downstream pressure at all times irrespective of varying flow requirements.



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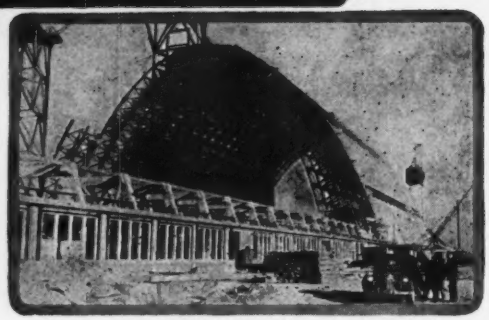

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Scotland Counties, to M. B. Kahn Constr. Co., 714 Lady St., Columbia, S. C., under **$50,000.** Bids 6/30.

†North Carolina—RANGES—U. S. Eng., 308 Customhouse, Wilmington, transition firing course ranges, Contr. 982-Eng-1876, Cumberland Co., to F. D. Cline, Fairview Rd., Raleigh, under **$50,000.**

†North Carolina—TRAINING AIDS—U. S. Eng., 308 Customhouse, Wilmington, training aids, Iden 982-43-263, Wayne Co., to F. D. Cline, Fairview Rd., Raleigh, less **$50,000.** Bids 6/30, awarded 7/1.

†North Carolina—CAR WASH RACKS—U. S. Eng., 308 Customhouse, Wilmington, car wash racks, No. 982-43-244, Durham Co., to P. S. West Constr. Co., Inc., Statesville, less than **$50,000.** Bids 6/18, awarded 6/18.

†North Carolina—FIRE ALARM SYSTEM—U. S. Eng., 308 Customhouse, Wilmington, fire alarm sys., Durham Co., to All-State Electric Co., Winston Salem, less than **$50,000.** Bids 6/22, awarded 6/22.

†North Carolina—IMPROVEMENTS—U. S. Eng., 308 Customhouse, Wilmington, imprvs., No. 982-43-254, Cumberland Co., to F. D. Cline, Fairview Rd., Raleigh, less than **$50,000.** Bids 6/24, awarded 6/24.

†North Carolina—IMPROVEMENTS—U. S. Eng., 308 Customhouse, Wilmington, imprvs., No. 982-43-251, Durham Co., to Wm. Muirhead Constr. Co., Durham, less than **$50,000.** Bids 6/23, awarded 6/23.

†North Carolina—IMPROVEMENTS—U. S. Eng., 308 Customhouse, Wilmington, imprvs., Contr. 982-eng-1876, Richmond Co., to Gilbert Eng. Co., Inc., Statesville, under **$50 000.**

★**†N. C., Greenville** — IMPROVEMENTS — Civil Aeronautics Admin., 2nd Region, Municipal Airport, Atlanta, Ga., imprvs., Proposal 2 R-395, to Blythe Bros. Co., 424 S. Brevard St., Charlotte, **$539,416.** Est. **$635,000.**

★**†N. D., Minot**—IMPROVEMENTS—Civil Aeronautics Admin., 608 S. Dearborn St., Chicago, Ill., imprvs., to Megarry Bros. and Wm. Coman & Son., 437 33 Ave., St. Cloud, Minn., **$797,000.** Bids 6/22. CD 6/9—ENR 3/18.

★**†Ohio**—HANGARS, etc.—U. S. Eng., Dayton, hangars, temporary frame bldgs., Contr. 1945-Eng-449, Montgomery Co., to Starrett Bros., Inc., 8 S. Dearborn St., and Michael Pontarelli & Sons, 4248 N. Kilpatrick St., Chicago, Ill. **$500,000-$1,000,000.**

†Ohio—HANGAR DOORS—U. S. Eng., Dayton, hangar doors, Contr. No. 1945-1946-Eng-451, Montgomery Co., to Truscon Steel Co., 1315 Albert St. Ext., Youngstown, under **$50,000.**

★**†Ohio**—AIR FORCES INSTALLATION—U. S. Eng., Dayton, construction at army air forces installation, Montgomery Co., to A. Farnell Blair, Decatur Ga., approx. **$2,000,000;** construction at army air forces installation, Montgomery Co., to Penker Associates, Inc., 1030 Summer St., Cincinnati, over **$1,000,000.** CD 2/16—ENR 2/18.

†Ohio — ELECTRICAL DISTRIBUTION — U. S. Eng., 522 U. S. Post Office & Courthouse, Cincinnati, electrical distr. and floodlighting facilities, Contr. 203-Eng-2274, Franklin Co., to Gustav Hirsch Organization, 319 W. Broad St., Columbus, under **$50,000.**

†Oaiahoma—IMPROVEMENTS—U. S. Eng., 416 Wright Bldg., Tulsa, imprvs., bldg., Solic. 957-Neg-305, Oklahoma Co., to Ditmars-Dickmann Co., Muskogee, under **$50,000.**

†Oklahoma—IMPROVEMENTS—U. S. Eng., 416 Wright Bldg., Tulsa, imprvs., bldg., Sol. 95 7-Neg-43-326, Oklahoma Co., to Hoke Constr. Co., **Stillwater,** under **$50,000.** CD 6/28—ENR 7-1.

†Oklahoma — OIL STORAGE — U. S. Eng. 416 Wright Bldg., Tulsa, addnl. fuel oil storage, Contr. 957-eng-1997, Oklahoma Co., to Leland Fikes, t/a Leland Fikes, Contractor, Gulf States Bldg., Dallas, Tex., under **$50,000.**

†Oklahoma—IMPROVEMENTS—U. S. Eng., 231 W. Main St., Denison, Tex., imprvs., drainage, Jackson Co., to J. Parrott, 403 S. Haskell St., Dallas, Tex. Est. under **$100,000.**

†Okla., Ada — IMPROVEMENTS — Civil Aeronautics Admin., Dpt. Commerce, P. O. Box 1689, Fort Worth, Tex., imprvs., Schedules 1 and 2, grading, drainage, asphalt surfacing, etc., to L. P. Reed, Meridian, Tex. **$156,500.**

†Okla., Shawnee—IMPROVEMENTS—Civil Aeronautics Admin., Dpt. Commerce, P. O. Box 1689, Fort Worth, Tex., imprvs., asphalt paving, to Trinidad Asphalt Mfg. Co., 600 S. Theresa St., St. Louis, Mo., **$91,700;** clearing, drainage, fencing, conditioning and seeding, etc., to Amis Constr. Co., Cotton Exchange Bldg., Oklahoma City, **$202,600.**

†Okla., Stillwater—IMPROVEMENTS—Civil Aeronautics Admin., Box 1689, Fort Worth, Tex., imprvs., Solic., 957-neg-43-337, to Booth & Olson, Inc., 622 Ins. Exch. Bldg., Sioux City, Ia., **$336,000.**

†Oregon—IMPROVEMENTS—U. S. Eng., 628 Pittock Blk., N.W. 10 Ave., and Washington St., Portland, imprvs., Klamath Co., to C. A. Dunn, Klamath Falls. Est. **$200,000.**

†Oregon — RUNWAY MARKINGS — U. S. Eng., Pittock Blk., Portland, runway markings, Contr. 698-eng-3514, Benton Co., to Howard Halvorson Co. and Oscar Butler & Son, 4224 N.E. Alberta St., Portland, under **$50,000.**

†Oregon — RUNWAY MARKINGS — U. S. Eng., Pittock Blk., Portland, runway mark-

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ings. Contr. 698-eng-3512, Multnomah Co., to Foster & Kleiser Co., 633 N.E. Everett St., Portland, under **$50,000.**

Pa., Pittsburgh—CRANEWAY REHABILITATION—Jones & Laughlin Steel Co., 3 and Ross Sts., rehabilitating craneway, replacing covered rails and welding structural steel to existing girders, Carson St. Plant, own forces. **$50,000.** B. J. Carlock, 2709 St., ch. engr. SS Wks.

†**South Carolina**—FIRE ALARM SYSTEM—U. S. Eng., 33 Customhouse, Charleston, fire alarm sys., Charleston Co., to American District Telegraph Co., 145 Bay St., Charleston. Est. less than **$50,000.** Bids 6/29, awarded 6/29.

†**South Dakota**—IMPROVEMENTS—U. S. Eng., 1709 Jackson St., Omaha, Neb., imprvs., Hughes Co., to C. E. Weir, Sioux Falls, under **$50,000.**

†**Tennessee**—FIRE ALARM SYSTEM—U. S. Eng., Grant St. west of Westwood St., Mobile, Ala., fire alarm sys., Contr. 469-Eng-5168, Shelby Co., to American District Telegraph Co., W. U. Bldg., Memphis, under **$50,000.**

★**Texas and Missouri**—GAS PIPELINE—Panhandle Eastern Pipe Line Co., Bartlesville, Okla. and 1223 Baltmr St., Kansas City, Mo., 120 mi. 26 in. natural gas pipeline carrier between point near Amarillo, Tex. to Kansas City, Mo., also relaying 36 mi. 22 in. line paralleling part of main line, to Bechtel Co., 220 Montgomery St., San Francisco, Calif., O. E. Dempsey Constr. Co., Kennedy Bldg., Tulsa, Okla., and H. C. Price Co., Bartlesville, Okla., approx. **$9,800,000.**

†**Texas**—CONSTRUCTION—U. S. Eng., Fort Sam Houston, addnl. construction, Webb Co., to H. B. Zachry, P. O. Box 596, San Antonio, over **$50,000.** Awarded 6/30. Additional to CD 6/9—ENR 6/17, under CA.

†**Texas**—ELECTRIC DISTRIBUTION SYSTEM—U. S. Eng., Fort Sam Houston, electrical distr. sys., Coryell Co., to Taylor Constr. Co., Taylor, under **$50,000.**

†**Texas** — ELECTRICAL DISTRIBUTION SYSTEM, etc.—U. S. Eng., 416 Wright Bldg., Tulsa, Zone 2, Okla., electrical distr. sys. street lighting, Contr. 957-Eng-2055, Dallam Co., to H. M. Nicholason, 939 S. Broadway, Los Angeles, Calif., under **$50,000.**

†**Texas**—FENCING, etc.—U. S. Eng., Fort Sam Houston, addnl. fencing, training aids, Kinney Co., to Waco Constr. Co., Med. Arts Bldg., Waco, under **$50,000.**

†**Texas**—FIRE ALARM SYSTEM—U. S. Eng., Fort Sam Houston, automatic fire alarm sys., McCulloch Co., to American District Telegraph Co., First National Bank Bldg., Fort Worth, under **$50,000.**

†**Texas**—FUELING STATION—U. S. Eng., Fort Sam Houston, fueling station, facilities, Kinney Co., to W. J. Aldrich, 414 Insurance Bldg., San Antonio, under **$50,000.**

†**Texas**—IMPROVEMENTS—U. S. Eng., 25 St. and Avenue F, Galveston, imprvs., Sol. 359-43-C165, Cameron Co., to Briggs & Darby, Sunset Rd., San Antonio, **$100,000-$500,000.**

★†**Texas**—IMPROVEMENTS—U. S. Eng., 25 St. and Avenue F, Galveston, imprvs., paving, concrete pipe, etc. Sol. 359-43-C156, Cameron Co., to H. B. Zachry, P. O. Box 596, San Antonio, over **$500,000.** CD 7/2—ENR 7/8.

★†**Texas**—IMPROVEMENTS—U. S. Eng., 416 Wright Bldg., Tulsa, Okla., imprvs., aprons, runway exten., dust palliative treatment Contr. 957-Eng-1979, Dallam Co., to Ottinger Bros., Petroleum Bldg., Oklahoma City, Okla., **$500,000-$1,000,000.**

†**Texas** — IMPROVEMENTS — U. S. Eng., Fort Sam Houston, imprvs., Howard Co., to H. R. Richburg, Midland, under **$50,000.**

†**Texas** — IMPROVEMENTS — U. S. Eng., 231 W. Main St., Denison, imprvs., link trainer bldg., etc., Tarrant Co., to Rob. E. McKee, 1918 Texas St., El Paso, **$50,000-$100,000.**

★†**Texas**—IMPROVEMENTS—U. S. Eng., 231 W. Main St., Denison, imprvs., road, etc., Contr. 359-Eng-5576, Victoria Co., to Texas Bitulithic Co., 111 Commerce St., Dallas **$500,000-$1,000,000.**

†**Texas** — IMPROVEMENTS — U. S. Eng., 231 W. Main St., Denison, addnl. imprvs., Wichita Co., to H. S. Moore, Ada, Okla., under **$50,000.**

†**Texas** — LOADING PLATFORMS, etc. — U. S. Eng., 25 St. and Avenue F, Galveston, loading platforms, etc., Harris Co., to Schneider Constr. Co., N. Main St., Houston, under **$50,000.**

†**Texas**—MOTOR PARK FACILITIES—U. S. Eng., Fort Sam Houston, motor park facilities, incl. grading, paving, Kinney Co., to Waco Constr. Co., 1201 Med. Arts Bldg., Waco, under **$50,000.**

†**Texas**—RUNWAY, etc.—U. S. Eng., Albuquerque, N. M., addnl. runway, taxiways, parking apron, Contr. 911-Eng-2055, Presidio Co., to E. Loyd, 3101 Stadium St., Fort Worth, **$400,000-$500,000.**

†**Texas**—TELEPHONE INSTALLATIONS—U. S. Eng., Fort Sam Houston, outside telephone installations, etc., Bell Co., to AAA Air Conditioning Corp., 2913 Gaston St., Dallas, under **$50,000.**

†**Texas**—GASOLINE STORAGE TANKS—U. S. Eng., 416 Wright Bldg., Tulsa, Zone 2, Okla., gasoline storage tanks, Contr. 957-eng-

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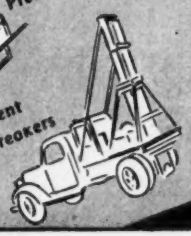
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UNCLASSIFIED (Contracts Awarded, Cont'd.)

2003, Dallam Co., to H. J. Happel & Co., Muskogee, Okla., under **$50,000.**

†Texas — IMPROVEMENTS — U. S. Eng., Fort Sam Houston, imprvs., Tom Green Co., to Jim H. McCormick, San Angelo, under **$50,000.**

†Texas — IMPROVEMENTS — U. S. Eng., Fort Sam Houston, imprvs., Tom Greene Co., to A. R. Barbee & W. L. Clendenen, San Angelo, under **$50,000.**

†Texas—RIFLE RANGES—U. S. Eng., 416 Wright Bldg., Tulsa, Zone 2, Okla., rifle ranges, Contr. 957-eng-2004, Dallam Co., to Wm. G. Walton, c/o Walton & Co., National Reserve Life Bldg., Topeka, Kan., under **$50,000.**

†Texas—SEEDING—U. S. Eng., Fort Sam Houston, field seeding development, etc., Midland Co., to Cage Bros. & J. F. Malcolm, Bishop, under **$50,000.**

†Texas—TAXIWAY—U. S. Eng., Albuquerque, N. M., taxiway, Contr. 911-Eng-2060, El Paso Co., to Lee Moor Contg. Co., El Paso, **$100,000-$500,000.**

Texas—TRAINING AIDS, etc.—U. S. Eng., Fort Sam Houston, visual training aids, tactical training facilities, etc., Bell Co., to S. R. Franck, 4328 Glenwick Lane, Dallas, under **$50,000.**

†Texas—TRAINING AIDS, etc.—U. S. Eng., Fort Sam Houston, visual training aids, tactical training facilities, Coryell Co., to Ed. Johnson, Waco, under **$50,000.**

Tex., Agua Dulce—OIL WELL—Clara Driscoll, Driscoll Hotel, Corpus Christi, drilling, developing new deep test oil well, to Sullivan & Garnett, Corpus Christi, about **$25,000.**

†Tex., Alice—IMPROVEMENTS—City, c/o E. G. Lloyd, Jr., mayor, imprvs., to Brown & Root, Inc., P. O. Box 1139, Austin, **$172,138.** Bids 2/10. CAA.

Tex., Winnsboro—OIL PIPELINE—Talco Asphalt & Refining Co., 35 mi. 6 in. oil pipeline carrier, force account. About **$70,000.**

†Utah—IMPROVEMENTS—U. S. Eng., 32 Exchange Pl., Salt Lake City, imprvs., to R. E. McKee, P. O. Box 1110, Ogden, **$100,000-$500,000,** Bids 6/28; drilling addnl. water supply wells, to Roscoe Moss Co., 4360 W. 6 St., Los Angeles, Calif., under **$50,000;** addnl. water supply facilities, to E. Barker, Ness Bldg., Salt Lake City, under **$50,000,** all Davis Co.

†Utah—IMPROVEMENTS—U. S. Eng., 32 Exchange Pl., Salt Lake City, imprvs., addnl. generator facilities, Tooele Co., to Geo. A. Carruth & Sons, Evanston, Wyo., under **$50,000.** Bids 6/28.

†Utah—IMPROVEMENTS—U. S. Eng., 32 Exchange Pl., Salt Lake City, imprvs., bldgs., Salt Lake Co., to Ford J. Twaits Co., Boston Bldg., Salt Lake City, **$50,000-$100,000.** Bids 6/15. CD 6/22—ENR 6/24.

†Utah—IMPROVEMENTS—U. S. Eng., 32 Exchange Pl., Salt Lake City, imprvs., to Ford J. Twaits Co., Boston Bldg., Salt Lake City, under **$50,000;** addnl. generator facilities, to R. J. Daum, P. O. Box 1, Salt Lake Military Airport, Salt Lake City, under **$50,000,** both Tooele Co. Bids 6/26 and 6/29 respectively. CD 7/6—ENR 7/8.

†Utah—IMPROVEMENTS—U. S. Eng., 32 Exchange Pl., Salt Lake City, imprvs., paving and stabilization roads, Weber Co., to O. Nelson, Logan, under **$50,000.** Bids 6/26.

†Utah—IMPROVEMENTS—U. S. Eng., 32 Exchange Pl., Salt Lake City, imprvs., water tank, Weber Co., to Ford J. Twaits Co., 420 Boston Bldg., Salt Lake City, under **$50,000.** Bids 6/15.

†Washington—CLEARING, etc.—U. S. Eng., 800 3 Ave., Seattle, Zone 4, clearing, grubbing, Snohomish Co., to Associated Sand & Gravel Co., **3124 Pacific Ave.**, Everett, under **$50,000.**

†Washington—CONSTRUCTION, etc.—U. S. Eng., 800 3 Ave., Seattle, Zone 4, addnl. construction, installation, King Co., to A. W. Johnson & Goetz & Brennan, 208 E. Pacific St., Seattle, under **$50,000.**

†Washington—CONSTRUCTION—U. S. Eng., 800 3 Ave., Seattle, Zone 4, addnl. construction, King Co., to A. F. Mowat Construction Co., 1231 3 Ave. Bldg., Seattle, Zone 1, under **$50,000.**

†Washington — ELECTRICAL SERVICE — U. S. Eng., 800 3 Ave., Seattle, Zone 4, electrical service, King Co., to O. A. Carlson, 2212 2 Ave., Seattle, under **$50,000.**

†Washington — ELECTRICAL SERVICE — U. S. Eng., 800 3 Ave., Seattle, Zone 4, addnl. electrical service, King Co., to Holert's Electric Service, 2300 W. Spokane St., Seattle, under **$50,000.**

†Washington — ELECTRICAL SERVICE — U. S. Eng., 800 3 Ave., Seattle, Zone 4, electrical service sys., Skagit Co., to City Electric & Fixture Co., 1022 3 Ave., Seattle, Zone 4, under **$50,000.**

†Washington — IMPROVEMENTS — U. S. Eng., 800 3 Ave., Seattle, Zone 4, imprvs., removing revetments, Snohomish Co., to Morrison-Knudsen Co., Inc., 319 Bway., Boise, Idaho, **$100,000-$500,000.**

†Washington — IMPROVEMENTS — U. S. Eng., 800 3 Ave., Seattle, Zone 3, clearing, grubbing, removal bldgs., grading, King Co., to West Coast Constr. Co., Textile Tower, Seattle, **$100,000-$500,000.**

†Washington—RUNWAY EXTENSION, etc. —U. S. Eng., 800 3 Ave., Seattle, Zone 4, runway exten., taxiway, herdstand[illegible] and removal of revetments, Contr. [illegible]-Eng-10300, Snohomish Co. to Morrison-Knudsen Co., Inc., Hoge Bldg., Seattle, **$100,000-$500,000.**

†Washington—UTILITIES—U. S. Eng., 800 3 Ave., Seattle, Zone 4, utilities, Snohomish Co., to Chisholm & Eiford, P. O. Box 54, Bellingham, under **$50,000.**

†Washington—CLEARING, etc.—U. S. Eng., 800 3 Ave., Seattle, Zone 4, clearing, grubbing, Grant Co., to Woodworth & Co., and Macdonald Bldg. Co., Moses Lake, under **$50,000.**

†Washington—CONSTRUCTION—U. S. Eng., 800 3 Ave., Seattle, Zone 4, addnl. construction (unspecified), King Co., to The Austin Co., 16112 Euclid Ave., Cleveland, O., under **$50,000.**

†Washington — ELECTRICAL SERVICE — U. S. Eng., 800 3 Ave., Seattle, Zone 4, installing electrical service, Island Co., to City Electric & Fixture Co., 1022 3 Ave., Seattle, Zone 4, under **$50,000.**

†Washington—EMBANKMENT—U. S. Eng., 800 3 Ave., Seattle, Zone 4, embankment, Snohomish Co., to Associated Sand & Gravel Co., 3124 Paine St., Everett, under **$50,000.**

†Washington—END ZONES—U. S. Eng., Pittock Blk., Portland, Ore., end zones, Contr. 698-Eng-3506, Walla Walla Co., to Leonard & Slate, Multnomah St., Portland, Ore., under **$50,000.**

†Washington — FIRE PROTECTION FACILITIES—U. S. Eng., 800 3 Ave., Seattle, Zone 4, fire protection facilities, Spokane Co., to R. L. Moss & Co., Zenith, **$50,000-$100,000.**

†Washington — PUMP INSTALLATION — U. S. Eng., 800 3 Ave., Seattle, Zone 4, furnishing, installing pump, Spokane Co., to General Machinery Co., E3500 Riverside St., Spokane, under **$50,000.**

N. S., Mulgrave—WHARF—Dom. Government, Ottawa, Ont., reconstructing wharf, to J. P. Porter & Sons, Ltd., 1010 W. St. Catherine St., Montreal, Que., $245,000. K. M. Cameron, Dpt. P. W., Ottawa, Ont., engr.

Ont., Kingston—DOCKS and WHARVES—Canadian Locomotive Co., Ltd., Kingston, repairing docks and wharves, to Canadian Dredge & Dock Co., Ltd., Wellington St. About **$55,000.**

Que., Drummondville — PIERS — Southern Canada Power Co., Ltd., 355 St. James St., Montreal, concrete piers at tail race power house, Hemming Falls, to Creaghan & Archibald, 1440 W. Ste. Catherine St., Montreal. Est. **$25,000.**

Que., Gaspe—WHARF—Dominion Govt., Ottawa, Ont., wharf to U. Ste. Marie, 61 St. Cleophas, Beauport, **$99,942.** K. M. Cameron, Ottawa, Ont., engr.

Que., Montreal — IMPROVEMENTS — Dpt. National Defense (Air) Ottawa, Ont., imprv. bldg., to J. R. Loyer, 8605 St. Denis St., about **$400,000.** C. David, 1440 St. Catherine St., archt. CD 5/11.

LATIN AMERICA

Mexico, Nuevo Laredo—Dpt. P. Bldgs., Mexico City and City of Nuevo Laredo, plan auditorium bldg. Over $150,000.

PUBLIC BUILDINGS

PROPOSED WORK

†Ariz., Tucson—Home Owners' Loan Corp., Pacific Bldg., San Francisco, 150 family unit conversion program.

†California—U. S. Eng., 74 New Montgomery St., San Francisco, housing, Central California, Spec. 894.

†California—U. S. Eng., 74 New Montgomery St., San Francisco, bldg., Spec. 1010; bldg. alterations, Spec. 1005; bldg., Spec. 1013, all San Francisco Co.

†California—City of Oakland Housing Auth., 935 Union St., Oakland, rejected bids July 2, dormitory accommodations, Calif. 4694; housing, Calif. 4605; Calif. 4702, Calif. 4712, for NHA. CD. 7/7, under LB, ENR, 6/10.

★ **†California**—Contra Costa Housing Auth., 700 D St., Martinez, plans by E. Geoffrey Bangs, 605 Market St., Keith O. Marbert, 564 Market St., and Eldridge T. Spencer, 369 Pine St., San Francisco, family dwelling units, administration bldg., Calif. 4731, $1,750,000-$2,000,000.

†California—City of Vallejo Housing Auth., Victory Apts., Ryder St., Vallejo, plans by D. H. Horn, Hotel Claremont, Berkeley, dormitory accommodations, Calif. 4732, for NHA. CD 6/24—ENR 7/1.

†California—Pub. Housing Auth., NHA, 785 Market St., San Francisco, plans by G. Stanley Wilson 3781-6 St., Riverside dormitory accommodations, Calif. 4729 and family dwelling units, Calif. 4730. CD 6/30—ENR 7/8.

†Calif., Berkeley—Home Owners' Loan Corp., Pacific Bldg., San Francisco, plans by W. H. Ratcliff, 2323 Shattuck Ave., converting fraternity house into 13 living units, 2589 Le Conte Ave. $20,000.

†Calif., Berkeley—Home Owners' Loan Corp., 821 Market St., San Francisco, plans by W. H. Ratcliff, 2323 Shattuck Ave., con-

PUBLIC BLDGS. (Proposed Work, Cont'd.)

verting fraternity house into 12 living units, 2412 Piedmont Ave. $20,000.

†**Calif., Marysville**—Pub. Bldgs. Admin., 18 and F Sts., Wash. 25, D. C., community hospital. FWA.

†**Calif., Oakland**—Home Owners' Loan Corp., Pacific Bldg., San Francisco, plans by Blanchard, Maher & Ward, 368 Pine St., San Francisco, converting residence into living units, 936 Third St. Over $10,000.

†**Calif., Oakland**—Home Owners' Loan Corp., Pacific Bldg., San Francisco, plans by Rob. A. Hutchison, 2433 Andover St., converting store bldg. into 3 living units, 2609 E. 14 St. $15,000.

†**Calif., Oakland**—Home Owners' Loan Corp., Pacific Bldg., San Francisco, plans by A. A. Cantin, 704 Market St., San Francisco, converting residence into 4 living units, 2215 48 Ave. $10,000.

†**Calif., San Diego**—Home Owners' Loan Corp., Pacific Bldg., San Francisco, 250 family unit conversion program.

★†**Calif., San Diego**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, 500 family dwelling units, Calif. 4735; 250 dormitory units, Calif. 4736; 300 family dwelling units, Calif. 4737; 200 family dwelling units, Calif. 4738.

†**Calif., San Francisco**—Home Owners' Loan Corp., Pacific Bldg., plans by S. Lightner Hyman, A. Appleton & Associates, 68 Post St., converting property into living units, 925 Guerrero St. Over $30,000.

†**Calif., San Francisco**—Home Owners' Loan Corp., Pacific Bldg., plans by M. A. Sheldon, 681 Market St., conversion of flats into living units, 2254-6 Fulton St. $15,000.

†**Calif., San Francisco**—Home Owners' Loan Corp., Pacific Bldg., San Francisco, plans by Fred H. Reimers, 233 Post St., converting stores into living units, 919-22 Irving St., $17,000; 215 California St., $13,000; 470 Castro St., $22,000.

†**Calif., San Francisco**—Home Owners' Loan Corp., Pacific Bldg., plans by S. Lightner Hyman, A. Appleton & Associates, 68 Post St., converting stores to provide addnl. living units, 4015-18 Balboa St. Over $7,000.

†**Calif., San Francisco**—Home Owners' Loan Corp., Pacific Bldg., plans by S. Lightner Hyman, A. Appleton & Associates, 68 Post St., converting lofts into living units, Kearny St. and Maiden Lane. Over $75,000.

†**Calif., San Francisco**—Home Owners' Loan Corp., Pacific Bldg., plans by H. Rafael Lake, 320 Market St., converting dwelling into living units, 27 Buena Vista Terrace. $10,000.

†**Colo., Gateway**—Pub. Housing Auth., NHA, Dierks Bldg., 1006 Grand Ave., Kansas City, Mo., 23 family dwelling units, Colo. 5102; 6 dormitory units, Colo. 5103. CD 6/18—ENR 6/24.

†**Colo., La Junta**—Home Owners' Loan Corp., Woodmen of the World Bldg., Omaha, Neb., 75 family unit conversion program.

†**Delaware**—U. S. Eng., 6 and Walnut Sts., Phila., Pa., addnl. bldgs., New Castle Co.

†**District of Columbia**—Home Owners' Loan Corp., 2 Park Ave., New York, N. Y., 150 family unit conversion program.

†**D. C., Wash.**—Home Owners' Loan Corp., 2 Park Ave., New York, N. Y., 150 family unit conversion program.

★†**Fla., Miami**—Federal Works Agency, Candler Bldg., Atlanta, Ga., plans by Stewart & Skinner, 1500 Alton Rd., Miami Beach, hospital bldg. $1,500,000.

†**Georgia**—U. S. Eng., Post Office Bldg., Savannah, housing units, A-14361, Chatham Co. $150,000.

†**Georgia**—U. S. Eng., Post Office Bldg., Savannah, bldg., Type D-M, Richmond Co.

†**Georgia**—U. S. Eng., 512 Spring N.W., Atlanta, housing units, T-6854, Bibb Co. $100,000.

†**Georgia**—U. S. Eng., Post Office Bldg., Savannah, bldg., T-6841, Liberty Co.

†**Indiana**—Delaware Machinery & Tool Co., S. Mulberry St. and Big Four R. R., Muncie, plant expansion, equip. $350,000. Defense Plant Corp. will finance.

†**Iowa**—U. S. Eng., Fort Des Moines, bldg., Polk Co. Under $50,000.

†**La., Alexandria**—Home Owners' Loan Corp., Sterick Bldg., Memphis, Tenn., 75 family unit conversion program.

†**Maine**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., community house, etc., Me. 17053. Government has withdrawn project. CD 7/2—ENR 6/28.

†**Maryland**—John Dulaney & Co., Salisbury, dehydration plant bldgs. $250,000. Defense Plant Corp. will finance. Malone & Williams, Salisbury, archts.

†**Md., Aberdeen**—Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., 144 unit dormitory housing, Md.-18266.

†**Md., Aberdeen**—Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., 380 unit family housing, Md.-18267.

†**Michigan**—Brunswick-Balke-Colender Co., Muskegon, aircraft assembly plant. $375,000. Defense Plant Corp. will finance.

★†**Michigan**—Ford Motor Co., Willow Run, plant, $3,300,000. Defense Plant Corp. will finance.

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PUBLIC BLDGS. (Proposed Work Cont'd.)

†**Mich., Benton Harbor**—Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland, O., 40 unit family housing, Mich-20205.

★**Mich., Flint**—City, Women's Hospital, brick, steel, stone, concrete hospital, $1,000,000.

†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, bldgs., observation towers, Scottsbluff Co. Under $50,000.

†**N. Y., Buffalo**—Deaconess Hospital, 562 Riley St., revised plans by F. J. and W. A. Kidd, 524 Franklin St., hospital addn $486,000. **FWA.** CD 10/6—ENR 10/15.

†**N. Y., Utica**—Home Owners' Loan Corp., 2 Park Ave., New York, 150 family unit conversion program.

★†**Texas**—Defense Plant Corp., 811 Vermont Ave. N.W., Wash., D. C., plans by W. D. LaRue, c/o Goodyear Tire & Rubber Co., Baytown, synthetic rubber plant expansion, $1,250,000. Goodyear Rubber Co., 1144 E. Market St., Akron, O., and General Tire & Rubber Co., 1708 E. Market St., Akron, O., will operate.

†**Ohio**—Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland, postponed indefinitely, family dwellings, Ohio-33263. Potter, Tyler & Martin, 35 E. 7 St., Cincinnati, archt. CD 7/2—ENR 7/8.

†**O., Lima**—Home Owners' Loan Corp., 209 W. 7 St., Cincinnati, 75 family unit conversion program.

†**O., Mansfield**—Home Owners' Loan Corp., 209 W. 7 St., Cincinnati, 130 family unit conversion program.

†**Oregon**—Portland Housing Auth., Alderway Bldg., Portland, bids within 30 days, family rowhouse dwellings, Ore. 35266, for NHA. $300,000. CD 7/1—ENR 7/8.

†**Ore., Grand Ronde**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Wash., 72 unit dormitory housing, Ore.-35270.

†**Ore., Grand Ronde**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Wash., 100 unit family housing, Ore.-35269.

†**Ore., Lebanon**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Wash., 80 unit family housing, Ore.-35268.

†**Pennsylvania**—Pub. Housing Auth., NHA, 270 Broadway, New York, N. Y., site imprvs., housing, Pa. 36201.

†**Tenn., Humboldt**—Federal Works Agency, 18 and F Sts. N.W., Wash. 25, D. C., plans by Dent & Aydelott, 1st Natl. Bank Bldg., Memphis, hospital. $200,000.

Tex., Amarillo—A. P. Hancock, city mgr., plans by E. F. Rittenberry & Son, Fisk Bldg., health center, facilities. $46,000. Applied for FWA funds.

†**Tex., Beaumont, Orange and Port Arthur**—Pub. Housing Auth., NHA, 1205 Electric Bldg., Seventh and Taylor Sts., Fort Worth, 300 family trailer units, Tex. 41590; 100 family trailer units, Tex. 41591; 100 family trailer units, Tex. 41592.

†**Tex., Freeport**—Pub. Housing Auth., NHA, 1205 Electric Bldg., Seventh and Taylor Sts., Fort Worth, 96 dormitory units, Tex. 41592.

†**Tex., Gatesville**—Pub. Housing Auth., NHA, 1205 Electric Bldg., 7 and Taylor Sts., Fort Worth, 222 dormitory units, Tex. 41588; 80 family dwelling units, Tex. 41589.

†**Utah, Brigham City**—Home Owners' Loan Corp., Pacific Bldg., San Francisco, Calif., 15 family unit conversion program.

†**Utah, Provo**—Home Owners' Loan Corp., Pacific Bldg., San Francisco, Calif., 50 family unit conversion program.

†**Virginia**—Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., temporarily held up construction dormitory housing, Va.-44278. Carneal, Johnston & Wright, 1000 Atlantic Life Bldg., Richmond, archts. CD 7/1—ENR 5/27.

†**Washington**—U. S. Eng., 800 3 Ave., Seattle, Zone 4, housing facilities, Neg. 622; bldg., Neg. 625, King Co.

★**Wash., Bremerton**—City, sketches by Naramore & Brady, Dexter Horton Bldg., Seattle, city hall, $500,000, two 1 story, 100x120 ft., brick, masonry fire stations, $167,000. Will seek federal funds.

†**Wash., Northport**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, 40 unit family housing, Wash., 44232.

Wash., Seattle—City, County-City Bldg., Zone 3, plans by G. W. Stoddard, Orpheum Bldg., health center. $400,000.

Ont., Goderich—Huron Co., court house, $150,000. R. Patterson, County Bldg., engr.

Que., Quebec City—St. Pascal Park Reg., c/o F. A. Chouinard, city clk., 152 one story, bsmnt., brick on concrete block houses, $300,000.

BIDS ASKED

Bids Asked Late in July

†**Oregon**—Portland Housing Auth., Alderway Bldg., Portland, 50 homes, for NHA, $150,000. CD 6/30—ENR 7/8.

Bids Asked After July 9

†**W. Va., Point Pleasant**—Federal Works Agency, 606 State Planters Bldg., Richmond, Va., hospital and nurses home. W. Va. 44123. Kyle & Fortney, 1107 Union Trust Bldg., Charleston, archts.

PUBLIC BLDGS. (Bids Asked, Cont'd.)

Bids Asked After July 20

†**Pennsylvania**—Pub. Housing Auth., NHA, 270 Bway., New York 7, N. Y., temporary family dwellings, Pa. 36429. Plans deposit $50. CD 7/1—ENR 7/8.

Bids Asked July 23

†**Calif., San Pablo**—Federal Works Agency, 2323 Fulton St., Berkeley, temporary 20 room wood-frame school bldg., Calif. 4-497, for San Pablo School Dist. $90,000. Plans deposit $25. Franklin & Kump, 251 Kearney St., San Francisco, archt.

Que., Gaspe—R. T. Donald, Dpt. of M. & S., Ottawa, Ont., diesel power plant for Dom. Government, Ottawa, Ont.

Bids Asked July 26

†**California**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, family dwelling units, community bldg., Calif. 4716. C. F. Gromme, Alberta Bldg., San Rafael, archt. CD 5/27—ENR 6/10.

†**Va., Norfolk** — At office Federal Works Agency, 601 State-Planters Bank Bldg., Richmond, Zone 19, 7 elementary school bldgs. on sites in vicinity of federal housing communities, on outskirts of here. $529,300. J. B. Walford, 103 E. Cary St., Richmond, archt.

Bids Asked After July 26

†**New York**—Pub. Housing Auth., NHA, 270 Bway., New York, Zone 7, administration bldg., site imprvs., NY 30031. Plans deposit $25. E. B. Green, 250 Delaware Ave., Buffalo, archt. CD 6/19—ENR 5/27.

Bids Asked After August 2

†**New Jersey**—Pub. Housing Auth., NHA, 270 Bway., New York 7, N. Y., community bldg., N.J. 28051. Plans deposit $10. L. V. Pohlman, 1140 E. Jersey St., Elizabeth, archt. CD 7/1—ENR 7/8.

Bids Asked About August 16

†**Calif., Marysville**—Federal Works Agency, Pub. Bldgs. Admin., Emergency Operations Unit, 18 and F Sts. N.W., Wash. 25, D. C., Marysville Community Hospital, 1 story, timber bldg., adjacent to present Yuba County Hospital, for Yuba Co. $350,000. Douglas D. Stone & L. B. Mulloy, Associate, 381 Bush St., San Francisco, archts. CD 10/8—ENR 10/15.

Bids Asked

†**Connecticut**—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., (selected bidders.) bldg., No. 43-276 Hartford Co.

†**Louisiana**—U. S. Eng., 25 St. and Avenue F, Galveston, Tex., bldgs., Vernon Co. Under $50,000.

†**New York**—U. S. Eng., Chimes Bldg., Syracuse, bldg., etc., Oneida Co. $50,000.

†**Texas**—U. S. Eng., 416 Wright Bldg., Tulsa, Okla., fire station, wash racks, brick waterworks pump house, etc. Sol. 957, Neg-43-347, Gray Co.

†**Wisconsin**—A. O. Smith Corp., 3533 N. 27 St., Milwaukee, 340x444 ft. main bldg., 60x120 ft. garage, and 50x120 ft. boiler house, for propeller plant. Defense Plant Corp. will finance. CD 6/15—ENR 6/17, under CA.

LOW BIDDERS

†**California**—Pub. Housing Auth., NHA, 785 Market St., San Francisco, July 8, temporary dwelling units, Calif. 4720, from M. J. King, 231 Franklin St., San Francisco, **$268,327.** CD 6/28.

★†**Conn., Bridgeport** — Bridgeport Hospital, Inc., Grant St. and Central Ave., July 8, hospital addn., Conn. 6-140, from E. & F. Constr. Co., 94 Wells St., Bridgeport, **$553,000.** FWA. CD 6/23—ENR 6/24.

†**Kansas**—Pub. Housing Auth., NHA, Dierks Bldg., 1006 Grand Ave., Kansas City, Mo., June 30, family housing, Kan. 14130, from Evans Const. Co., R.R. 3, Lees Summit, Mo., $215,855. CD 6/10—ENR 6/17.

†**Kansas**—Pub. Housing Auth., NHA, Dierks Bldg., 1006 Grand Ave., Kansas City, Mo., June 30, family housing, Kansas 14131, from Jack Const. Co., Security Natl. Bank Bldg., Kansas City, Kan. **$235,000.** CD 6/10—ENR 6/17.

†**Kansas**—Pub. Housing Auth., NHA, Dierks Bldg., 1006 Grand Ave., Kansas City, Mo., June 30, family housing, Kansas 14132, from Jack Const. Co., Security Natl. Bank Bldg., Kansas City, Kan., **$232,800.** CD 6/10—ENR 6/17.

★†**Maryland**—Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., July 8, family dwellings, Md. 18259 and 18260, from Durham & Irvine, 1713 Rittenhouse Sq., Phila., Pa., **$544,005.** CD 6/23—ENR 6/24.

†**Mass., Weymouth**—Federal Works Agency, 99 Chauncy St., Boston, July 2, 2 story, cemnt., 46x196 ft. hospital addnl., Mass. 19-109, from M. S. Kelliher Co., 38 Chauncy St., Boston, **$174,300.** CD 5/24—ENR 6/10.

†**Minn., Browerville** — Todd County Dairy Cooperative, June 30, general contract 1 story, cemnt., 108x1515 ft., brick, tile milk dehydrating bldg., from Nelson Bros. Constr. Co., Willmar, **$73,150.** Bids on mechanical trades later. Bids 6/30. Federally financed. CD 6/23—ENR 7/1.

†**Missouri**—U. S. Eng., 10 E. 17 St., Kansas City, Mo., bldgs., Ste. Genevieve Co., from McCarthy Bros. Constr. Co., 4903 Delmar Blvd., St. Louis, Mo., under **$200,000.**

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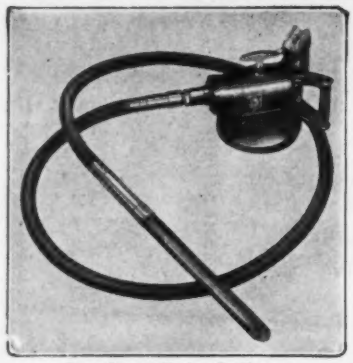

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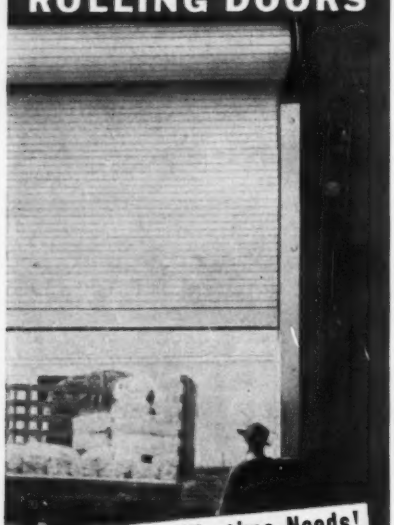

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PUBLIC BLDGS. (Low Bidders, Cont'd.)

★†**Oklahoma**—Pub. Housing Auth., NHA, 1205 Electric Bldg., Fort Worth, July 7, Tex., dormitory housing, from Ransdell Const. Co., Liberty Bank Bldg., Dallas, Tex., **$582,000.** CD 6/30—ENR 7/8.

★†**Pennsylvania**—Pub. Housing Auth., NHA, 270 Bway., New York, 7, N. Y., July 8, family housing, Pa. 36432 and dormitory housing, Pa. 36433, Base Bid 2, community, commercial and dormitory bldgs., complete, not prefabricated, incl. connections to underground utilities, electrical distr., site surface work, etc., from Delval Constr. Corp., Harwood Bldg., Scarsdale, N. Y., **$282,200*****Base Bids 1, dwelling bldgs. only and Base Bid 3, overall bid for Base Bids 1 and 2, from John A. Johnson & Sons, Inc., 270 41 St., Brooklyn, N. Y., **$350,000** and **$547,000** respectively. CD 6/30—ENR 6/24.

†**Texas** — Pub. Housing Auth., NHA, 1205 Electric Bldg., Fort Worth, July 2, family dwelling units, Tex. 41576, from Jim Handley, Inc., 2017 W. Gray St., Houston, Base bid 1, **$189,813,** Base bid 2, **$194,413.** CD 6/22—ENR 6/24.

†**Wisconsin**—Pub. Housing Auth., NHA, 201 N. Wells St., Chicago, Ill., June 25, storm sewers, walks, bituminous resurfacing at housing, Wis. 40711, from Bahr Const. Co., 2204 S. 10 St., Manitowoc, **$45,500.** CD 6/22.

Puerto Rico—Auction Board of Insular Dpt. of Interior, Puerto Rico, San Juan, Contr. 1, 5 fire stations, San Juan, and warehouse (in Santurce), fire stations, Rio Piedras, Bayamon, Catano, Carolina, Fajardo, and Contr. 2, 2 fire stations, Ponce, fire stations in Guayama, Santa Isabel, Coamo, and Arroyo, from Ramon Maria Roig, **$72,200** and **$37,900** respectively***Contr. 3, in Mayaguez, Aguadilla, San German, Sabana Grande, Yauco and Guanica, from Anibal Escanellas, **$43,600*****Contr. 4, in Arecibo, Utuado, Manati, Vega Baja and Vega Alta, from Juan E. Casanova, **$28,500*****Contr. 5, in Humacao, Caguas, Yabucoa, Juncos, Gurabo, San Lorenzo, Cayey, from Miguel J. Nollas, **$36,257.**

CONTRACTS AWARDED

†**Arkansas**—U. S. Eng., 300 Bway., Little Rock, addnl. bldgs., Drew Co., to Peterson & McFayden, Commercial-National Bank Bldg., Little Rock, under **$300,000.**

†**California**—U. S. Eng., 74 New Montgomery St., San Francisco, warehouse conversion, Central California, to Langlais Electric Co., 227½ Monterey St., Salinas. Awarded 7/2.

†**California**—U. S. Eng., 74 New Montgomery St., San Francisco, bldg., Spec. 839, San Francisco Co., to A. F. Mattock Co., 212 Clara St., San Francisco. Awarded 7/2. CD 6/30—ENR 7/8.

†**California**—U. S. Eng., 74 New Montgomery St., San Francisco, altering bldgs., Northern California, to O. C. Moroney, 1437 Drake Ave., Burlingame. Awarded 7/1.

†**California**—U. S. Eng., 74 New Montgomery St., San Francisco, bldg., San Francisco Co., to W. C. Tait, Inc., 461 Market St., San Francisco. Awarded 7/1.

★†**California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, bldgs., platforms, grading, etc., Sol. No. 1247, San Bernardino Co., to Ford J. Twaits Co., 451 Boylston St., Los Angeles, over **$1,000,000.** CD 5/6—ENR 5/13.

†**California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, warehouses, San Bernardino Co., to Griffith Co., 502 Los Angeles Railway Bldg., Los Angeles, under **$100,000.**

†**California**—U. S. Eng., 2109-8 St., Sacramento, Zone 8, temporary frame bldg., Contr. 1105-eng-5130, Yuba Co., to C. L. Wold, P. Midbust and Anderson & Ringrose, Marysville, **$100,000-$500,000.**

†**Connecticut**—Pub. Housing Auth., NHA, 24 School St., Boston, Mass., electrical work for housing, Conn. 6182, 6183, 6184, to Thames Electric Co., 3 Thames St., Groton, Mass.; electrical distri., to T. Bross & Co., 276 Franklin Ave., Hartford. CD 4/15—ENR 4/22, under LB.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, plant bldg., Neg-Jax-43-1170, Dade Co., to Lester F. Preu Corp., 1440 Alton Rd., Miami Beach, under **$50,000.** Awarded 6/29.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, magazine walls, Neg-W.P.B. 43-41, St. Lucie Co., to Cleary Bros. Constr. Co., Georgia Ave., West Palm Beach, under **$50,000.** Awarded 6/30.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, plant addn., Neg-O.R.-43-81, Orange Co., to R. E. Clarson, Inc., 101-5 St. S., St. Petersburg, under **$50,000.** Awarded 6/30.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, bldg., Neg-Jax-43-1194, Lee Co., to R. E. Clarson, Inc., 101 5 St. W., St. Petersburg, under **$50,000.** Awarded 6/30.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, plant and bldg. addn., Neg-Jax-43-1086, Clay Co., to Southern Builders Inc., 1502 E. Columbus Dr., Tampa, under **$500,000.** Awarded 6/26.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, bldg., Neg-Jax-43-1111, Duval Co., to Paul A. Miller Constr. Co., Leesburg, under **$500,000.** Awarded 6/26.

†**Florida**—U. S. Eng., 575 Riverside Ave., Jacksonville, Zone 2, repair shop, Neg-Jax-43-1103, Duval Co., to A. S. Wikstrom, Orlando, under **$50,000.** Awarded 6/24.

†**Georgia**—U. S. Eng., Post Office Bldg., Savannah, bldgs., Bibb Co., to Smith, Yetter & Griffin, Hotel Dempsey, Macon. Over **$200,000.** Bids 6/25. CD 6/22.

†**Georgia**—U. S. Eng., Post Office Bldg., Savannah, bldg., Chatham Co., to Wesley Constr. Co., 441 Courtlandt St. N.E., Atlanta, under **$50,000.** Bids 6/28.

★†**Idaho**—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Seattle, Wash., family and single housing units, Projects 10102 and 10103, to Northwest Const. Co., Inc., 208 Burton Bldg., Portland, Ore., **$857,000.** CD 6/29—ENR 7/1 under LB.

★†**Idaho**—U. S. Eng., Pittock Blk., Portland, Ore., military installation, Minidoka Co., to Brennan & Cahoon, Pocatello, over **$1,000,000.** CD 6/30—ENR 7/8.

★†**Illinois**—U. S. Eng., 520 Merchandise Mart, Chicago, construction of army general hospital, Cook Co., to J. Emil Anderson & Son, 3659 W. Belle Plain St., Chicago, over **$1,000,000.** CD 7/7—ENR 6/10.

†**Louisiana**—U. S. Eng., 25 St. and Avenue F, Galveston, Tex., bldgs., Orleans Parish, to L. F. Favret, 937 Gravier St., New Orleans, **$50,000-$100,000.** Bids 7/6.

†**Louisiana**—U. S. Eng., 300 Bway., Little Rock, addnl. bldgs., Lincoln Parish, to T. L. James & Co., Inc., Ruston, under **$500,000.**

†**Maine**—U. S. Eng., 31 St. James Ave., Boston, Mass., housing facilities, roads, utilities, Contr. 175-Eng-2584, Cumberland Co., to Brown Constr. Co., 562 Congress St., Portland, **$100,000-$500,000.**

†**Maine**—U. S. Eng., 31 St. James Ave., Boston, Mass., housing, operating facilities, roads and utilities, Contr. 175-eng-2592, Cumberland Co., to Caye Const. Co. Inc., 356 Fulton St., Brooklyn, N. Y., **$100,000-$500,000.**

†**Maine**—U. S. Eng., 31 St. James Ave., Boston, Mass., temporary bldgs., No. 175-43-NEG 388, Aroostook Co., to Perini & Sons Inc., Montwait Ave., Framingham, Mass. Est. **$100,000-$500,000.**

†**Massachusetts**—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., electrical work for bldg., Bristol Co., to Standard Electric Co., 1014 Main St., Springfield; electrical distr., to Coken Co., 16 Greene St., Providence, R. I. CD 7/7—ENR 7/15 under CA.

†**Massachusetts**—U. S. Eng., 31 St. James Ave., Boston Bldg., alterations, installations, Barnstable Co., to F. Grande & Son, 425-A Broadway, Everett. Est. under **$50,000.**

†**Massachusetts**—U. S. Eng., 819 Industrial Trust Bldg., Providence, R. I., bldg. extens., Bristol Co., to Home Guild, Inc., 101 Park Ave., New York, N. Y. Est. **$100,000-$500,000.** J. R. Worcester & Co., 79 Milk St., Boston, engrs.

†**Michigan** — Pub. Housing Auth., NHA, 2073 E. 9 St., Cleveland, O., schools for housing, Mich. 20060, to A. W. Kutsche & Co., 2111 Woodward Ave., Detroit, electrical work, to John R. Electric Shop, 68 E. Parkhurst Ave., Detroit. Est. **$150,000.** Bids 5/31. CD 5/25.

†**Michigan**—U. S. Eng., 700 Union Guardian Bldg., Detroit, zone 31, recreation bldg. and chapel, Iosco Co., to Spence Bros., 207 Brewer Arcade, Saginaw, less than **$1,000,000.**

†**Minnesota**—U. S. Eng., 1709 Jackson St., Omaha, Neb., converting bldgs. into propeller (air) mfg. bldgs. and addns., to Fegles Constr. Co., 711 Wesley Temple Bldg., Minneapolis. A. O. Smith, 3533 N. 27 St., Milwaukee, Wis., will operate. CD 6/23—ENR 7/1.

†**Missouri**—U. S. Eng., 10 E. 17 St., Kansas City, Mo., bldg., Phelps Co., to J. Epple, Columbia. Est. under **$100,000.**

†**Missouri**—U. S. Eng., 10 E. 17 St., Kansas City, Mo., bldg., to Gamble Constr. Co., 620 Chestnut St., St. Louis, Zone 1. Bids 6/29.

†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, bldgs., Phelps Co., to James Leck Co., 211 S. 11 St., Minneapolis, Minn., under **$50,000.**

★†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, housing, Phelps Co., to Peter Kiewit Sons Co., 1024 Omaha Natl. Bank Bldg., Omaha. Est. approx. **$2,000,000.**

★†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, housing, Redwillow Co., to Peter Kiewit Sons Co., 1024 Omaha Natl. Bank Bldg., Omaha. Est. approx. **$2,000,000.**

★†**Nebraska**—U. S. Eng., 1709 Jackson St., Omaha, general contract bldgs., Dawes Co., to C. C. Larsen & Sons, 10 N. Main St., Council Bluffs, Ia.; outside utilities, to Iceland Constr. Co., 3867 Leavenworth St., Omaha. Total est. **$2,000,000.** CD 7/7, under CA.

†**New Jersey**—U. S. Eng., 120 Wall St., New York 5, N. Y., bldg., Middlesex Co., to Anthony Lewis, Inc., 40 Clinton St., Newark, **$50,000-$100,000;** bldg., Middlesex Co., to Mahieu Const. Co., 38 Wagaraw Blvd., Paterson, **$50,000-$100,000.** CD 6/25.

†**New Mexico**—U. S. Eng., Albuquerque, addnl. temporary frame bldg., Contr. 911-Eng-2046, De Baca Co., to Taylor & Chambers, Roswell, **$100,000-$500,000.**

★†**New York**—U. S. Eng., 120 Wall St., New York, Zone 5, bldg. conversion, Suffolk Co., to Albert A. Lutz Co., Inc., 50 E. 42 St., New York. Est. **$1,000,000-$1,500,000.** Bids 6/24. CD 6/24—ENR 6/10.

†**North Carolina**—U. S. Eng., 308 Customhouse, Wilmington, bldg., No. 982-43-242, Cumberland Co., to R. K. Stewart & Son, Highberland Co., to R. K. Stewart & Son, High Point, less than **$50,000.** Bids 6/19, awarded 6/22.

PUBLIC BLDGS. (Contracts Awarded, Cont'd.)

†**North Carolina**—U. S. Eng., 308 Customhouse, Wilmington, bldgs., No. 982-43-252, Onslow Co., to F. N. Thompson, Lawyers Bldg., Raleigh, less than **$50,000.** Bids 6/24, awarded 6/25.

†**Ohio**—U. S. Eng., 522 U. S. Post Office & Courthouse, Cincinnati, temporary frame bldg., Contr. 1945-Eng-457, Greene Co., to James I. Barnes Constr. Co., 131 N. Ludlow St., Dayton, **$100,000-$500,000.**

†**Ohio**—U. S. Eng., 522 U. S. Post Office & Courthouse, Cincinnati, magazines, Contr. 1945-Eng-453, Montgomery Co., to Frank Burke & Son, 35 S. Dearborn St., Chicago, Ill., under **$50,000.**

†**Ohio**—U. S. Eng., 522 U. S. Post Office & Courthouse, Cincinnati, temporary frame bldg., Contr. 1945-Eng-458, Greene Co., to Penker Associates, Inc., 1030 Summer St., Cincinnati, **$100,000-$500,000.**

★†**Ohio**—U. S. Eng., 522 U. S. Post Office & Courthouse, Cincinnati, temporary frame bldgs., Contr. 1945-Eng-452, Montgomery Co., to The F. K. Vaughn Bldg. Co., First National Bank Bldg., Hamilton, **$500,000-$1,000,000.**

†**Ohio**—U. S. Eng., Dayton, steam plant addn., Contr. 1945-Eng-448, Greene Co., to Lieb-Jackson Co., Inc., 337 S. High St., Columbus, under **$50,000.**

†**Oklahoma**—U. S. Eng., 416 Wright Bldg., Tulsa, addnl. storage facilities, Sol. 957-Nog-41-328, Oklahoma Co., to L. Fikes, 909 Tex. Bank Bldg., Dallas, Tex., **$50,000-$100,000.**

†**Oregon**—U. S. Eng., Pittock Blk., Portland, bldg. facilities, Jefferson Co., to Fox Constr. Co., Salem, under **$50,000.**

†**Oregon**—Portland Housing Auth., Alderway Bldg., Portland, 300 ft. outfall sewer, for housing, for NHA, to Gilpin Constr. Co., 4450 N.W. Front St., Portland, approx. **$25,000.** Awarded 6/29.

†**South Carolina**—U. S. Area Eng., Florence Bldg., Florence Co., to HSB and FJ Constr. Co., Florence. Bids 6/28.

†**South Carolina**—U. S. Eng., Charlotte, N. C., bldg., Greenville Co., to W. M. Fine, Spartanburg, S. C., under **$50,000.**

†**Tennessee**—U. S. Eng., 512 Spring St. N.W., Atlanta, Ga., bldgs., Coffee Co., to Goldschmidt & Bethune, First Natl. Bank Bldg., Atlanta, Ga., under **$200,000.**

†**Texas**—U. S. Eng., 25 St. and Avenue F, Galveston, addnl. bldg., Cameron Co., to H. B. Zachery, P. O. Box 596, San Antonio and Laredo, under **$50,000.**

†**Texas**—U. S. Eng., Fort Sam Houston, cold storage bldg., Spec. 878, Bexar Co., to Hill & Combs, 321 Melrose Place, San Antonio, over **$50,000.**

†**Texas**—U. S. Eng., 231 W. Main St., Denison, addnl. bldgs., facilities, utilities, etc., Lamar Co., to Hal. C. Dyer, Great National Life Bank Bldg., Dallas, **$100,000-$500,000.**

†**Texas**—U. S. Eng., San Antonio, temporary frame bldg., facilities, Contr. 2161-Eng-1380, Bastrop Co., to V. Prassel, 116 Cardinal St., San Antonio, **$50,000-$100,000.**

†**Texas**—U. S. Eng., Fort Sam Houston, bldg., alterations, Spec. 879, Bexar Co., to A. E. Rheiner & Co., 812 Builders Exchange Bldg., San Antonio. Less than **$200,000.**

†**Utah**—U. S. Eng., 32 Exchange Pl., Salt Lake City, plant addns., to Daley Bros., 426 Bryant St., San Francisco, Calif., **$100,000-$500,000;** constructing roads, to Gibbons & Reed, 259 W. 3 So. St., Salt Lake City, under **$50,000,** both Tooele Co.

†**Utah**—U. S. Eng., 32 Exchange Pl., Salt Lake City, housing addns., Weber Co., to Merrill & Lauch, c/o Wendover Air Base, Wendover, **$100,000-$500,000.** Bids 6/29.

†**Virginia**—U. S. Eng., Fort Norfolk, Norfolk, temporary housing, Contr. W-616-eng-2535, Princess Anne Co., to Vanguard Const. Corp., 369 Lexington Ave., New York, N. Y., **$100,000-$500,000.**

★†**Virginia**—Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., housing, Va. 44287, Va-44286 and Va-44290, to Wm. R. Goss Co., 1643 Connecticut Ave. N.W., Wash., D. C., **$1,368,000.** Bids 6/21. CD 6/29—ENR 7/1 under LB.

†**Virginia**—Pub. Housing Auth., NHA, Temporary Bldg. 2, 19 and D Sts. N.W., Wash., D. C., dormitory housing, VA 44277, to Goode Constr. Corp., Builders Bldg., Charlotte, N. C., **$241,664.** Bids 6/21. CD 6/29—ENR 7/1 under LB.

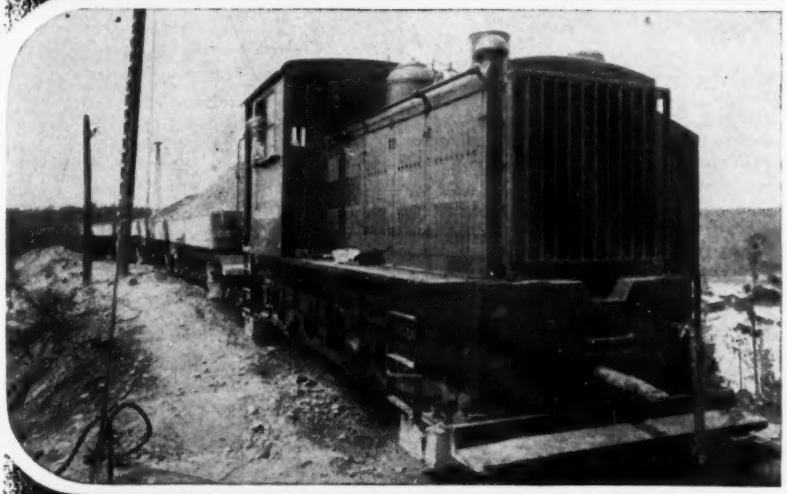
†**Washington**—U. S. Eng., 800 3 Ave., Seattle, Zone 4, bldg., King Co., to Nelse Mortensen & Co., 1021 Westlake Ave. N., Seattle, under **$50,000.** CD 6/30—ENR 7/8.

†**Washington**—U. S. Eng., 800 3 Ave., Seattle, Zone 4, housing facilities, King Co., to Johnson, Goetz & Brennan, 208 E. Pacific St., Seattle, **$100,000-$500,000.** CD 7/12—ENR 7/15.

★†**Washington**—Industrial Company, housing for civilian workers, to Ford J. Twaits Co., 451 S. Boylston Ave., Los Angeles, Calif. and Morrison-Knudsen Co., 810 Title Guarantee Bldg., Los Angeles, Calif., approx. **$1,000,000;** streets and roads for above, to Myers Bros., 3407 San Fernando Rd., Los Angeles, Calif., **$1,000,000.**

†**Washington**—U. S. Eng., 800 3 Ave., Seattle,

★ PLYMOUTH



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PUBLIC BLDGS. (Contracts Awarded, Cont'd.)

Zone 4, bldg., Pierce Co., to Ashwell-Twist Co., 967 Thomas St., Seattle, **$100,000-$500,000.**

†Wis., Madison—St. Mary's Hospital, 720 S. Brooks St., general contract, nurses training school, DPW 47-136, to Dougherty & Dougherty, 119 Indianapolis Blvd., Whiting, Ind., **$219,837**; electrical work to Bradford Electric Co., 323 N. Lake St., **$17,820. FWA.** CD 4/14—ENR 4/22

Wis., Marshfield—City, general contract 1 story, 56x100 ft. brick factory addn., concrete fdn., day labor. Johnson Gloves, Inc., 307 W. 2 St., lessee. CD 6/15—ENR 6/17

Que., Hyacinthe—Dominion Govt., 13 bldgs., to Stewart Constr. Co., Ltd., 21 Dufferin St., Sherbrooke Est. **$300,000.** Dpt. Naval Affairs, Cartier Sq., Ottawa, Ont., archt. Dpt. M. & S., Ottawa, engr.

Que., Montreal—Province of Quebec, Quebec City, aircraft school, to J. R. Loyer, 8605 St. Denis St., Montreal. Est. **$400,000.**

Que., St. Hyacinthe—Dpt. Natl. Defense (Sea), Ottawa, Ont., 13 addnl. bldgs. for Naval Training Centre, to Stewart Constr. Ltd., Dufferin Ave., Sherbrooke, about **$250,-000-$300,000.**

COMMERCIAL BUILDINGS

PROPOSED WORK

Conn., Bridgeport—Owner, c/o Everett C. Bradley, archt., 302 Union Ave., West Haven, brick garden apartments. Over $150,000. FHA.

★ **N. J., Trenton**—Brunbrook Builders, 1776 Bway., New York, N. Y., group 2 story, bsmnt., brick residences. $500,000. FHA.

Pa., New Wilmington—Campbell Co., 125 E. Neshannock Ave., fifty brick, tile residences, Neshannock Twp. $300,000.

Wash., Seattle—North Pacific Constr. Co., 1311 N. 79 St., Zone 3, plans by M. Vanhouse, 4328 Burke Ave., Zone 3, 63 homes, E. 51 St. and 45 Ave N.E.

Alaska, Seward—C. E. Tecklenberg, T. Parich and J. Matich, Seward, concrete store and apartment bldg.

B. C., Vancouver—Fraser Valley Lands Ltd., 839 W. Hastings St., housing, 460 acre site.

Ont., Bowmanville—General Hospital Bd., 28 Liberty St., hospital addn. $150,000.

Ont., Windsor—J. P. Thompson, archt., 1191 Windermere Rd., bids soon 60 bed hospital addn., for Grace Hospital, Salvation Army, 20 Albert St., Toronto, and 339 Cranford St., Windsor. $150,000. CD 6/16.

CONTRACTS AWARDED

Calif., Burbank — Burbank Gardens, 4416 Verdugo Ave., 95 double dwellings to J. Paul Campbell, 1310 Morningside Dr., approx. **$380,-000.**

Calif., Richmond—Fox-West Coast Theatres, 988 Market St., San Francisco, theatre, 1,000 seating capacity to Cahill Bros., 206 Sansome St., San Francisco. Est **$150,000.** Walker & Eisen, 457 Eisen St., Los Angeles, archts. CD 6/22—ENR 6/24

Calif., San Francisco—Heyman Bros., 564 Market St., forty-four 1 story frame residences. Owner builds. Over **$150,000.**

Calif., South San Francisco—Geo. Arthur & Sons, 941 South Claremont St., San Mateo, 47 residences, owner builds; electrical work, to Carl Mausser, 236 Lorton Ave., Burlingame. Over **$150,000.** CD 6/21—ENR 6/24.

Conn., Bridgeport — Bayview Park Apartments, Inc., M. Briedberg, 211 State St., 2 story groups, brick, garden type apartment bldgs., Boston Ave., Fitch Estate, to Shaughnessy Constr. Co., 2210 Madison Ave. Est. **$200,000.** Fletcher Thompson, Inc., 211 State St., engrs.

La., New Orleans—Elysian Homes, Inc., New Orleans, thirty-one 4-plex bldgs., 124 housing units, Elysian Fields Ave., Benedt, Treasure and Humanity Sts., to Pittman Bros. Constr. Co., 2800 N. Galvez St., under **$500,000.**

Mich., Detroit—Mt. Carmel Mercey Hospital, 6071 W. Outer Dr., general contract 3 story, bsmnt., 49x168 ft., brick, steel, concrete hospital addn., to Walter Butler Co., Inc., 1300 Minn Bldg., St. Paul, Minn.

Tex., Fort Worth—J. Driskell & Co., 4500 Donnelley St., 35 or more frame type dwellings, facilities, utilities, force account. **$150,-000.** CD 7/2—ENR 7/8.

Tex., Fort Worth—Lindwood Development Co., 2700 Merrimac St., 32 or more 1 story, 30x40 ft. frame duplexes, concrete fdns., to New River Lumber Co., Fort Worth, approx. **$150,000.**

Tex., Fort Worth—Westgate, Inc., 3100 Bristol Rd., fourteen 2 story, 37x38 ft. and twelve 1 story, 40x40 ft., brick, frame dwellings, concrete fdns., etc., force account. Approx. **$175,000.**

Wis., West Allis (br. Milwaukee)—Cleveland Park Land Co., 7919 W. National Ave., twenty 28x64 ft., frame residences, block fdns., to Brody & Sondel, Inc., 7919 W. National Ave.; electrical work, to Lloyd Elec Co., 2864 N. Maryland Ave., Milwaukee.

Wis., Racine—L. G. Henriksen, 3001 Washington Ave., sixteen 1½ story, 24 x 30 ft., frame residences, concrete block fdns., owner builds; electrical work, to J. Small, Racine.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Calif., Auburn—PLANT—L. F. Johnson, reduction plant at Lakeview copper, gold, silver mine, 6 mi. east of here.

Ia., Newton—FACTORY—Newton Mfg. Co., rebuilding factory destroyed by fire, over $40,000.

Minn., Owatonna—FACTORY—Josten Mfg. Co., plans by Magney, Tusler & Setter, 202 Foshay Tower, Minneapolis, 2 story, 80x115 ft. rein.-con., brick factory. Over $40,000 (unofficial).

New York — PLANT — American Aviation Corp., Wm. A. Bates, vice pres., P.O. Box Jamestown, bids soon 1 story, aircraft mfg. plant addn. Keith Rider, c/o owner, engr.

N. Y., Jamestown—PLANT—Crawford Furniture Mfg. Co., Allen St. exten., 1 story plant addn. $40,000-$50,000.

O., Galion — FACTORY — Pressed Steel Body Co., Galion, 1 story, brick factory addn. $40,000 or more.

★ **Ore., Roseburg**—LUMBER MILL—Chas. E. Miller, c/o Youngs Bay Lumber Co., Astoria, lumber mill. $650,000.

Pa., Forest Hills (br. Pittsburgh)—LABORATORY—Westinghouse Electric & Mfg. Co., Geo. H. Parkman, dir. Bldg. Constr. and Maintenance, Maloney Bldg., Pittsburgh, soon lets contract 1 story, 29x59 ft. brick combustion laboratory addn. G. E. Heilman, Maloney Bldg., Pittsburgh, co. engr.

Pa., Scranton—PLANT—Murray Corp. of America, 7700 Russell St., Detroit, Mich., brick, steel, concrete plant bldg. addns. $150,000. Giffels & Vallet, 1000 Marquette Bldg., Detroit, Mich., engrs.

Tenn., Memphis—WAREHOUSE—William R. Moore Drygoods Co., W. R. King, pres., 3 and Monroe Sts., large warehouse. $150,000.

Tex., Crocket — PLANING MILL — Hervey Lumber Co., Crockett, rebuilding planing mill.

Tex., Edinburg—PLANTS—Valley Canneries, Edinburg, expansion 2 vegetable and food canning plants. $60,000.

Va., Richmond — FOUNDRY — Reynolds Metal Corp., 810 E. Franklin St., brick, steel, rein.-con. foundry. Approx. $150,000. Giffels & Vallet, 1000 Marquette Bldg., Detroit, Mich. engrs.

Wash., Bellingham — WAREHOUSE — Bellingham Warehouse Co., brick warehouse, Commercial Point, $40,000.

Wis., Hortonville—WAREHOUSE—Fox Valley Canning Co., Hortonville, plans by J. F. Dreger 188 Waugoo St., Oshkosh, 1 story, 40 x 180 ft., hollow tile warehouse addn., concrete fdn.

Wis., Oshkosh—FACTORY—Oshkosh Motor Truck, Inc., 2302 Oregon St., 1 story, 100x 100 ft., concrete block, factory addn., concrete fdn

Alaska, Fairbanks—GARAGE—Service Motor Co., Fairbanks, rebuilding garage. $40,000.

Alta., McLennan—ENGINE HOUSE, etc.—Northern Alberta Ry. Co., J. M. MacArthur, genl. mgr., 211 C.P.R. Bldg., Edmonton, 2 stall engine house and boiler house. $45,000.

Alta, Ryeroft — ENGINE HOUSE, etc.—Northern Alberta Ry. Co., J. M. MacArthur, genl. mgr., 211 C.P.R. Bldg., Edmonton, 3 stall engine house and boiler house. $50,000.

Alta., Smith—ENGINE HOUSE—Northern Alberta Ry. Co., J. M. MacArthur, genl. mgr., 211 C.P.R. Bldg., Edmonton, engine house. $40,000.

B. C., Dawson Creek—ENGINE HOUSE—Northern Alberta Ry. Co., J. M. MacArthur, genl. mgr., 211 C.P.R. Bldg., Edmonton, Alta., 4 stall engine house. $40,000.

Man., West Kildonan (Postal District Winnipeg)—PLANT—Howard Smith Paper Mills, Ltd., 407 McGill St., Montreal, Que., 68x400 ft. plant addn., two 68x200 ft., wood on concrete bldgs. $40,000. J. Grant, Canada Paper Co., Ltd., Windsor Mills, Ont., engr

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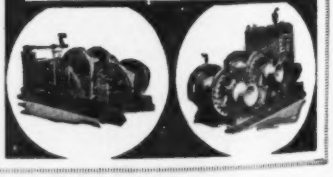

INDUSTRIAL BLDGS. (Proposed Work, Cont'd.)

N. S., Mattie Settlement (Postal Dist. Antigonish) — PLANT—Geo. T. Somers, Grosvenor, N. B., saw mill and allied plant constr.

Ont., London—FACTORY—Spramotor Ltd., R. McIlvenna, mgr., 1103 York St., 1 story, 95 x 115 ft., hollow tile factory addn. $45,000.

Ont., Seaforth—PLANT—Spence & Sons, 7 Main St., remodelling bldg., constr. refrigeration plant. $40,000.

Ont., Toronto — FACTORY — Wear Ever Brush Co. Ltd., c/o J. P. Arnott, 100 W. Adelaide St., factory. $50,000.

Ont., Toronto—PLANT—Maple Leaf Plastics Ltd., c/o S. M. Harris, 414 Bay St., mfg. plant. $50,000.

Ont., Toronto—PLANT—De-Hy Products Ltd., c/o D. R. Laing, engr., 82 Mason Blvd., dehydration plant. $50,000.

Ont., Toronto—PLANT—Gralumet Zinc Developers Syndicate Ltd., c/o S. Ciglon, barrister-at-law, 100 W. Adelaide St., mining, milling and reduction plant. $40,000.

Ont., Toronto—FACTORY—Great Northern Woods Ltd., c/o R. Fennell, solicitor, 357 Bay St., woodworking factory.

Ont., Toronto—PLANT—Hutchison Machine & Tool Co., Ltd., c/o Albert Ed. Hutchison, 520 Kingston Rd., plant. $40,000.

Ont., Windsor—REPAIR SHOP—Canadian Pacific R. R., T. B. Ballantyne, dist. eng., (Ontario Dist.), 215 High Park, Toronto, 20x90 ft. concrete car repair shop.

Que., Lachine—PLANT—Harrington Tool & Die Co., Ltd., 201 1 Ave., plans by G. D. Thompson, 2049 McGill College Ave., Montreal, 1 story, 35x81 ft. concrete plant exten., concrete fdn. CD 1/27—ENR 2/11.

BIDS ASKED

Bids Asked July 20

Pennsylvinia — PLANT — Carnegie Illinois Steel Corp., W. M. Reed, ch. engr., Carnegie Bldg., Pittsburgh, 2 sanitary and convenience bldgs., roll shop maintenance shops, locomotive repair shop, office, Allegheny Co. $100,000-$500,000. CD 6/8—ENR 6/10.

Bids Asked

Tex., Palestine—PLANT—Knox Glass Bottle Co., addn. plant unit (doubling existing capacity). $250,000. CD 7/1—ENR 7/8.

LOW BIDDERS

Que., Montreal — SHOP — Canadian Natl. R. R. B. Wheelwright, ch. engr. (Central Region), Union Sta., Toronto, Ont., 15 x 138 ft. brick shop addn., and 15 x 169 ft. lean-to, from J. S. Hewson, 660 W. St. Catherine St. Est. $40,000.

CONTRACTS AWARDED

Calif., Oakdale—PLANT—Oakdale Dehydrator Co., Oakdale, 4-tunnel dehydrator plant, to Wieland Bros., 919 1/2 Eye St., Modesto.

Calif., Oakland—WAREHOUSE — American Brass & Copper Co., 383 7 St., 100x100 ft. brick, frame warehouse, to W. K. Owen, 3145 Fleitner Ave.

Calif., San Jose — PLANT — International Business Machines, 254 S. Market St., plant alterations, to Swinerton & Walberg, 225 Bush St., San Francisco. Est. $50,000.

Mich., Detroit — PLANT — Motor Products Corp., 11801 Mack Ave., Detroit, brick, steel rein.-con. factory bldg. for plant addn., to The Albert A. Albrecht Co., 1204 Penobscot Bldg. Est. approx. $100,000. Smith, Hinehman & Grylls, 800 Marquette Bldg., engrs.

Minn., St. Paul—PLANT, etc.—Ford Motor Co., M. N. Johnson, branch mgr., 966 S. Mississippi River Blvd., general contract, 60x545 ft. exten. to mfg. bldg., for covered loading dock over existing railroad tracks, to G. J. Grant Constr. Co., 893 Como Blvd.

Mo., St. Louis—PLANT—Blanton Co., 3400 North Wharf St., Zone 7, superstructure 1 story, 77x103 ft., brick, concrete soy bean plant 3400 North Wharf St., to Alport Constr. Co., Ambassador Bldg., 7 and Locust Sts., Zone 1. Gray & Pauley, 3800 West Pine Blvd., Zone 8, archts.

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N. J., East Orange—STORAGE, etc.—Thos. Reynolds Co., 437 Central Ave., Newark, 1 story, L-shaped, brick storage bldg. and garage, to P. Jantelle Co., 788 Stuyvesant Ave., Irvington. $40,000. R. Calabrese, 65 Taylor St., Newark, archt.

N. J., Hoboken—WAREHOUSE—Bethlehem Steel Co., foot of 14 St., warehouse addn., sprinkler sys., to Bertoldi-Kelter Co., 55 W. 42 St., New York, N. Y. Lockheed-Greene, 10 Rockefeller Plaza, New York, N. Y., engrs.

N. C., Charlotte — TRUCK TERMINAL — Miller Motor Express, W. W. Miller, Jr., pres., 301 N. Brevard St., 2 story, 80x250 ft. brick truck terminal, Wilkinson Blvd. and Dowd Rd., to Ervin Constr. Co., Catawba, approx. $100,000.

O., Tiffin—FACTORY, etc.—Sterling Grinding Co. Div. of Cleveland Quarries Co., A. Green, vice pres., Guildhall Bldg., Cleveland, 1 story, 70x298 ft., brick, rein.-con., factory and tunnel to Steinle-Wolfe Co., 1575 Croghan St. Est. $60,000. Herman Kuhn, 69 Sycamore St., engrs. CD 6/11—ENR 6/17.

Pa., Phila.—MACHINE SHOP—Dodge Steel Co., 6501 Tacony St., 1 story machine shop, 6501 State Rd., to Unkefer Bros. Constr. Co., Otis Bldg., $60,000. Awarded 7/3.

Pa., Aliquippa—PLANT—Jones & Laughlin Steel Corp., 3 and Ross Sts., Pittsburgh, coal handling mixer bldg. exten., 67 ft. high, 30 ft. diam., rein.-con., to Koppers Co., Koppers Bldg., Pittsburgh, and E. C. Machin Co., 512 Hamilton St., Allentown.

Tex., Fort Worth—PLANT—Armour & Co., North Fort Worth, 77x156 ft., serum albumin plant, brick, tile, to Thos S. Byrne, Inc., Fort Worth National Bank Bldg., $123,500. W. C. Hedrick, 1005 First National Bank Bldg., archt.

Wash., Pateros—PLANT—Brewster-Pateros Processors, Inc., Pateros, 100x200 ft. fruit processing plant, rein.-con., to Austin Co., 16112 Euclid Ave., Cleveland, O. Est. $100,000.

Wis., Appleton—FACTORY—Kurz & Root Co., Appleton, 2 story, 28 x 34 ft., factory addn., 1 story, 14 x 22 ft. boiler room, concrete fdns., to R. Bleick, Appleton. R. M. Connelly, P. O. Box 84, engr.

Wis., Blair—CREAMERY—Preston Co-op. Creamery Assn., Blair, 1 story, 76 x 86 ft. and 22 x 60 ft. creamery addn., etc., to J. C. Schneider, Independence; electric wiring, to A. Peterson, Blair. CD 5/4—ENR 5/6.

Wis., Ellsworth—WAREHOUSE—Ellsworth Co-op. Creamery Assn., Ellsworth, 1 story, 40x126 ft. and 26x43 ft. concrete block warehouse addn., concrete fdn., to Frank Johnson, Ellsworth. CD 3/30—ENR 4/1.

Wis., Emerald—CREAMERY—Emerald Co-op. Creamery Assn., Emerald, 1 and 2 story, 39x59 ft. hollow tile creamery addn., concrete fdn., to M. Heiss, Glenwood Ct. CD 5/18—ENR 5/20.

Wis., Milwaukee—FACTORY—J. W. Speaker Corp., 1655 W. Water St., remodeling 3 story, 60 x 100 ft. factory, to Selzer-Ornst Co., 6222 W. State St., Wauwatosa; electrical work by Owner. F. Scott, 724 E. Mason St., archt.

Ont., Galt—PLANT—Whitehall Machine & Tools Ltd., 7 Dundas St., remodelling plant, to Thomas Constr. Co. Ltd., 45 Dickson St., Galt, Ont.

Ont., St. Catherines—FOUNDRY—McKinnon Industries, Ltd., 14 Ontario St., foundry addn., to Ontario Construction Co. Ltd., P. O. Box 36, St. Catherines, $96,000. A. E. Nicholson, 46 Queen St., St. Catherines, archt.

Ont., Toronto—FACTORY—J. C. Meadowcroft, archt., 1154 Beaver Hall Hill, Montreal, Que., 2 story, L-shaped, rein-con. plant exten., for Aluminum Co. of Canada, Ltd., 158 Sterling Rd., to Jackson-Lewis Co. Ltd., 80 King St. W., Toronto, $115,902 incl. equip. CD 6/23—ENR 7/1.

Que., Arvida—PLANT—Abrasive Co. of Canada Ltd., 14 Drake St., plant addn., two 40x40 ft. structures, concrete block and tile walls, concrete fdn., to Foundation Co. of Canada Ltd., 1538 W. Sherbrooke St., Montreal. Est. $50,000.

Que., Chandiere (Postal Dist. Quebec City) —POWER PLANT—Quebec Power Co. Ltd., 229 Joseph St., Quebec City, remodelling power plant, to Creaghan & Archibald, 1440 W St. Catherine St., Montreal. Est. $40,000.

Que., Montreal—PLANT—Canadian Vickers Ltd., 5136 Notre Dame St. E., plant extension, etc., to Augline-Norcross Quebec Ltd. 892 Sherbrooke St. W, about $300,000. CD 5/12—ENR 5/27.

Que., Montreal East (Postal Dist. Montreal) —PLANT—Canada Strip Mill Ltd., 7 Durocher St., plant exten., to Carter-Halls-Aldinger Co., Ltd., 419 Cherry St., Toronto, Ont., $100,000.

Que., Quebec City—PLANT—Eastern Canada Steel & Iron Works Ltd., 21 Lesage Ave., remodelling part of plant and addn., to F. I. Lamontagne, 411 Charest Blvd. Est. $40,000.

Que., St. Laurent (Postal District Montreal) —FACTORY—Ayerst, McKenna & Harrison, Ltd., 485 McGill St., Montreal, 2 story, 2 bsmnt., 50x122 ft., rein.-con. bldg.; 2 story 36x65 ft., and 1 story, 43x103 ft., concrete brick bldgs., to Foundation Co. of Canada Ltd., 1538 W. Sherbrooke St., Montreal, $160,000. CD 5/24—ENR 5/27 under Montreal.

Proposal Advertisements see p. 188 & 205
Postwar Projects see p. 161

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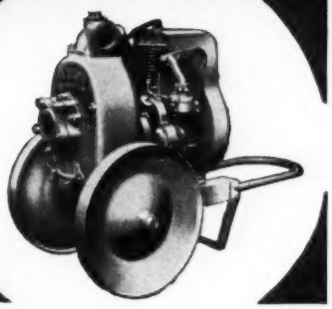

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OFFICIAL PROPOSALS

Bids: July 21, 1943 (155)

Construction of Sewers

CONSTRUCTION OF SEWERS
FEDERAL WORKS AGENCY
PROJECT NO. CONN. 6-107
HIGHWAY COMMITTEE OF THE CITY OF BRIDGEPORT, CONNECTICUT

Sealed bids for Contract No. 6, Federal Works Agency, Project Number Conn. 6-107 for the construction of approximately 4600 feet of 8" to 48" sewer, laterals, appurtenances, etc., will be received by Fred Schwarzkopf, Clerk of the Highway Committee of the City of Bridgeport, Connecticut, until two o'clock P. M. (E. W. T.) July 21, 1943, and then at said office publicly opened and read aloud.

The information for Bidders, Form of Bid, Form of Contract, Plans, Specifications, and Performance Bond may be examined at said office and copies thereof obtained upon payment of $10.00 for each set. Any bidder, upon returning such set promptly and in good condition, will be refunded his payment, and any non-bidder upon so returning such a set will be refunded $5.00.

THE HIGHWAY COMMITTEE OF THE CITY OF BRIDGEPORT reserves the right to waive any informalities in or to reject any or all bids.

Each bidder must deposit with his bid, security in the amount of 10% of the amount of the bid in the form and subject to the conditions provided in the Information for Bidders.

Attention of Bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under the Contract.

No bidder may withdraw his bid within 45 days after date of the opening thereof.

Envelope shall be plainly marked "Sewer Bids July 21, 1943"

FRED SCHWARZKOPF, CLERK OF THE HIGHWAY COMMITTEE OF THE CITY OF BRIDGEPORT, Connecticut.
ADDRESS: CITY HALL
July 3, 1943 BRIDGEPORT, Conn.

Bids: August 8, 1943 (156)

Earthen Dam and Appurtenances Des Moines Water Works, Des Moines, Iowa

Sealed bids will be received by the Board of Water Works Trustees, Des Moines Water Works, up to 10:00 A.M., Wednesday, August 8, 1943, at their office 1003 Locust St., Des Moines, Iowa, for furnishing certain materials and constructing an earthen dam forming an impounding reservoir. Separate bids will be received upon three parts of the job as follows:

Section A—Earthen dam to contain 575,000 cu. yds. more or less as measured in borrow pits and specified appurtenances.

Section D—Cast iron pipe and fittings f.o.b. cars, Des Moines, Iowa, to be used in the dam and to connect to proposed pumping station.

Section E—Valves f.o.b. cars, Des Moines, Iowa, to be used in connection with the pipe and fittings purchased under Section D.

All of the above work and materials shall be in accordance with plans and specifications on file at the office of the Des Moines Water Works and at the office of the engineers where same may be examined by prospective bidders. One copy of plans and specifications may be secured by application to either of the two undersigned upon payment of three dollars ($3.00) per copy.

Priority number of this job, AA-3.

The right is reserved to reject any or all bids or to waive any informality in any bid.

Board of Water Works Trustees
Des Moines Water Works
Dale L. Maffitt, Gen. Manager

Alvord, Burdick, & Howson, Engineers
1401 Civic Opera Bldg.
Chicago, Illinois.

Additional Proposals
Continued on page 205

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